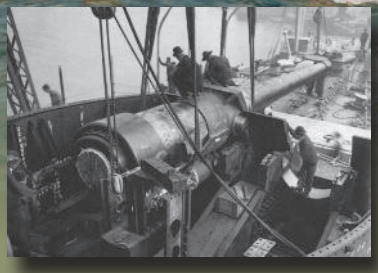
US NAVY BATTLESHIPS 1895–1908

The Great White Fleet and the beginning of US global naval power



BRIAN LANE HERDER

ILLUSTRATED BY ADAM TOOBY AND PAUL WRIGHT

NEW VANGUARD 286

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CONTENTS

INTRODUCTION 4

DEVELOPMENT 4
- Strategy and tactics
- Design and construction
- Weapons
- Enter the dreadnought

THE BATTLESHIPS 16
- Kearsarge class (1900)
- Illinois class (1900–01)
- Maine class (1902–04)
- Virginia class (1906–07)
- Connecticut class (1906–08)
- Mississippi class (1908)

THE BATTLE FLEET 31
- Personnel
- Naval bases
- Squadrons and fleets 1899–1907

THE GREAT WHITE FLEET 1907–09 37

LATE CAREERS 1909–41 42
- Post-cruise modernizations
- Veracruz 1914
- World War I 1917-1918
- *Kilkis* and *Lemnos* 1914–41

CONCLUSION 46

SELECT BIBLIOGRAPHY 47

INDEX 48

US NAVY BATTLESHIPS 1895–1908

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INTRODUCTION

The United States commissioned 27 battleships between 1895 and 1908. The first six played significant roles in the 1898 Spanish-American War and are detailed in the companion volume *New Vanguard 271: US Navy Battleships 1886–98*. The final 21 pre-dreadnoughts were commissioned after 1898 and are the subject of this title. All 21 postwar battleships participated in the Great White Fleet cruise, with 18 battleships completing a full circumnavigation of the world. The global odyssey heralded US political, military, and technological ascendance to great power status. As arguably the period's greatest peacetime naval feat, the Great White Fleet's triumph represented an appropriate curtain call for the pre-dreadnought era. Less than a year after the Great White Fleet's return, on January 4, 1910, the USN (United States Navy) would commission its first dreadnought, USS *Michigan* (BB-27). In 1895, the US Navy had been hopelessly outdated and ranked 12th-largest in the world behind China, Sweden, and Chile. By 1908, the USN ranked second only to Britain. The United States' meteoric rise from naval embarrassment to world-class maritime power had taken just over a decade.

DEVELOPMENT

Strategy and tactics

By the 1880s, a surging US economy and several international crises with Spain and South American powers had inspired Congress to rebuild the decrepit post-Civil War USN. The sweeping renewal proved total, demanding brand-new ships, massive industrial and technological investments, and an overhaul of training systems and professional education curricula that inspired a flourishing of American naval theory and debate. The virtually reborn institution became known as the "New Navy" or "Steel Navy" as the era coincided with the USN's adoption of steel warships. The vibrant, progressive new officer corps aggressively and successfully cultivated politicians and the public; USN officer Bradley Fiske observed, "The new navy was a child of public opinion created by naval officers."

Emergent US naval doctrine was adamant that the decisive weapon system was not the individual battleship itself, but the entire battle fleet. By the 1890s, the USN had elevated fleet concentration to virtually sacrosanct status.

Naval War College President Captain Caspar F. Goodrich closed the 1897 class with the following reminder:

> Certain truths … stand out so clearly that we are led to believe … that they exist in the real game of war... The strategic game shows most conclusively the necessity of concentrating the fighting forces of the fleet... He who scatters the fighting force (the battleships of the fleet) is vanquished at the outset. The fighting force should be like a spider at the center of its web… Concentration means strategic life, dispersion means strategic death.

The 1898 Spanish-American War saw the Steel Navy's new battleships, cruisers, and highly trained crews vanquish their Spanish counterparts in a shockingly one-sided conflict, vindicating the USN's politically controversial offensive strategy. The isolationist United States had been almost entirely inward-looking throughout its history, the result of wide oceans, a vast interior, and cultural disdain for fratricidal European politics. The 1890s ushered in a radical transformation as the nation's 400-year-old frontier closed, the US economy overtook Britain's as the world's largest, and Spanish-American War spoils unexpectedly delivered far-flung overseas possessions. The USN's world-renowned, pro-battle fleet strategist Captain Alfred Thayer Mahan neatly summarized the post-1898 paradigm shift: "What means less violent than war would in a half-year have solved the Caribbean problems, shattered national ideas deep-rooted in the prepossessions of a century, and planted the United States in Asia, face to face with the great world problem of the immediate future."

Colombia admires her fancy new "Easter Bonnet," an American battleship labeled "World Power" and feathered with a coal-smoke plume labeled "Expansion." Colombia's hatpin is a tiny saber. The young nation had been transformed from a fiercely inward-looking frontier republic to a modern overseas empire virtually overnight. American popular culture was still coming to terms with the sudden development, as suggested in this April 6, 1901, political cartoon from *Puck* magazine. (LOC)

Although tactical doctrine demanded concentration, strategic and political realities demanded two US battle fleets divided between Atlantic and Pacific coasts. The Atlantic was recognized as the most valuable and vulnerable seaboard, being richer, more populous, and closer to Germany, the enemy assumed to be the strongest.

However, the Pacific was of prime commercial interest, with massive Far East markets ripe for dumping excess American economic production. The USN was thus tasked with upholding the US government's "Open Door" China policy, as well as protecting American businessmen and missionaries in China. Additionally, the United States inherited a moral responsibility to defend the Philippines after unilaterally occupying the archipelago in 1898.

Transferring the US fleet between the Atlantic and Pacific would require a 2½-month, 14,000nm odyssey around South America consuming 5,000 tons of coal per battleship. After 1898, this was politically unacceptable and a Central American canal became imperative. A canal would not just protect US strategic security but promote American commerce; the Caribbean, meanwhile, would become an "American lake" hosting a necklace of USN bases guarding the canal's eastern approaches.

The 1850 Clayton-Bulwer Treaty between Britain and the United States required a Central American canal be neutral and demilitarized like its Suez counterpart, but by 1901, Republican President Theodore "Teddy" Roosevelt would insist on full American sovereignty over any isthmian

Several gleaming Connecticut-class battleships are seen underway in John Charles Roach's 1984 painting *The Great White Fleet*. Although once universal, by 1908, the United States was among the world's last major navies still painting its ships in the bright Victorian style. The Americans' peacetime 1907–09 global exercise was heavily inspired by the seven-month, 18,000-mile wartime odyssey of the Russian Baltic Fleet, which, in May, 1905, had ended in disaster at Tsushima. (US Navy)

canal. Ensnared in the Boer War and the Anglo-German naval race, Britain conceded. The Hay-Pauncefote Treaty of December 1901 abrogated sole canal authority to the United States. After fruitless negotiations with the Colombian government, the Roosevelt administration incited Panamanian separatists to declare independence from Colombia. By November 18, 1903, the Hay-Bunau-Varilla Treaty would establish US rights to build and operate the Panama Canal, Roosevelt claiming, "I took the Isthmus, started the canal and then left Congress not to debate the canal, but to debate me."

Although traditionally isolationist, the United States' 1823 Monroe Doctrine stated that any European takeover attempts of an independent nation in the Western Hemisphere would be regarded as "the manifestation of an unfriendly disposition towards the United States." In December 1902, Britain, France, and Germany initiated a 14-warship blockade of Venezuela to coerce that country into paying its outstanding foreign debts. Under Admiral of the Navy George Dewey, Roosevelt responded by concentrating 54 warships of the North Atlantic, Caribbean, European, and South Atlantic squadrons off Venezuela, including battleships *Kearsarge*, *Alabama*, *Massachusetts*, *Indiana*, *Iowa*, and *Illinois*. After the February 1903 resolution of the crisis, British Prime Minister, Arthur J. Balfour, proclaimed, "The Monroe Doctrine has no enemies in this country that I know of. We welcome any increase of the influence of the United States of America upon the great Western Hemisphere." It was a clear victory for Roosevelt's mantra to "Speak softly and carry a big stick."

A charismatic and impossibly exuberant polymath, Theodore "Teddy" Roosevelt published his seminal *Naval War of 1812* at age 23, establishing himself as a world-class naval expert. Already a boxer, hunter, cowboy, biologist, historian, widower, and New York Assemblyman before age 30, a meteoric 41-month ascension would rocket Roosevelt through stints as Assistant Secretary of the Navy, Spanish-American War hero, governor of New York, Vice President, and finally President of the United States by September 14, 1901 when he was 42 years old. (LOC)

The USN now saw Germany as its main rival, the result of aggressive German actions in the Pacific and German colonial aspirations in South America and the Caribbean. Roosevelt proclaimed, "If we build and maintain an adequate navy and let it be understood that … we are perfectly ready and willing to fight for our rights, then the chances of war will become infinitesimal." In response to the 1900 German Fleet Law and the 1902–03 Venezuela crisis, the USN's General Board composed its General Naval Scheme in October 1903. Designed to counter an expected 1920 German fleet of 41 battleships and 20 large cruisers, the tentative long-range plan called for a two-ocean, 370-ship US fleet of 48 battleships, 24 armored cruisers, 72 protected cruisers, 96

scout cruisers, 72 destroyers, 48 colliers, and ten auxiliaries.

Roosevelt and his fellow "big fleet" strategists abandoned static coastal defense as a naval mission. The US Army, traditionally lacking a compelling peacetime role, enthusiastically filled the vacant responsibility. By 1906, the Roosevelt-appointed Taft committee on coastal defenses recommended major expansions and upgrades to create a world-class American coastal fortification system of 500 heavy guns and 1,000 mortars.

The US Army's new coastal defense role perfectly complemented USN offensive strategy. By 1908, Roosevelt could state, "Let the port be protected by the [Army's] fortifications; the fleet must be foot-loose to search out and destroy the enemy's fleet; that is the only function … that can justify the fleet's existence."

Battleships *Missouri* (BB-11) and *Ohio* (BB-12) in the Panama Canal's Miraflores Locks, August 31, 1915. The view looks north towards the Atlantic. In the background is *Wisconsin* (BB-9). The battleships are returning to the Atlantic after making the US Navy's first battleship canal transit the previous month. (US Navy)

Since the early 1800s, the USN had maintained a handful of small squadrons scattered around the world on foreign stations. A standing, concentrated USN battle fleet had never been formed in peacetime. Roosevelt believed that a powerful, intact US battle fleet was the strongest deterrent to an enemy, regardless of where the fleet was actually located. The North Atlantic Squadron had executed the 1898 Cuba blockade and was the USN's largest and most important naval force. During the Venezuela crisis, on December 29, 1902, the North Atlantic Squadron was upgraded to the North Atlantic Fleet, while in 1903, the Asiatic Squadron was upgraded to the Asiatic Fleet. On January 1, 1906, the North Atlantic Fleet was renamed the Atlantic Fleet and all Asiatic-based US battleships were transferred home to be concentrated in the Atlantic.

Fleets were made up of squadrons and both fleets and squadrons were commanded by rear admirals. A squadron might be divided into four-ship divisions commanded by the senior captain (no more than four ships could be simultaneously commanded by semaphore signaling). Battleships remained the linchpin of the fleet. Cruisers scouted, raided, and conveyed messages, while destroyers screened battleships and made nighttime torpedo attacks against the enemy. Although the USN desired sufficient escorts and auxiliaries, Congress ordered 15 prestigious new battleships between 1898 and 1904, consuming 17 percent of the US federal budget. The result was an unbalanced, battleship-heavy fleet.

Battleship *Kentucky* being launched on March 24, 1898. Eschewing the traditional champagne, the Kentucky governor's prohibitionist daughter christened the battleship with a bottle of Kentucky spring water from the Lincoln Homestead. According to legend, numerous Kentucky colonels heroically smashed bottles of bourbon along *Kentucky's* hull as she slid past, graciously rescuing their adopted battleship from a career of certain maritime disaster. (US Navy)

Design and construction

Authorized in 1886, the 6,682-ton *Maine* and 6,315-ton *Texas* were the first USN warships to be called battleships, but they were each undersized, one-off misfits derived from the discredited echeloned battery concept. Judged obsolete and designated Second-Class Battleships before their 1895 commissionings, they proved conceptual dead-ends, contributing little to future US battleship design. The United States' first modern battleships were the three 10,288-ton Indiana-class "First-Class Seagoing Coastline" battleships, authorized

Sixty-year-old Vice Admiral William S. Sims as commander US Naval Forces Europe, 1918. Forever waging pet crusades, the relentlessly progressive Sims delighted in wrecking status quos. Tall, elegant, and charismatic, the magnetic Sims won scores of friends and enemies (and the 1921 Pulitzer Prize) during his volcanic career – "He was just so damn handsome," complained a fellow officer. Uncannily far-seeing, before 1914 Sims dismissed the battleship as obsolete and instead championed submarines, destroyers, convoys, and aircraft carriers. (NHHC)

in 1890 and commissioned in 1895–96. With their general form, powerful 13in/35 centerline battery, and heavy armor at the expense of speed, *Indiana* (BB-1), *Massachusetts* (BB-2), and *Oregon* (BB-3) established the design lineage all future US battleships would evolve from. The succeeding 11,340-ton *Iowa* (BB-4), commissioned in 1897, was an improved *Indiana* armed with a 12in/35-caliber battery and boasting superior deep-sea features such as higher freeboard and greater speed and range. After *Iowa*, Congress authorized two 11,540-ton Kearsarge-class battleships (BB-5 and BB-6) for 1895 and three 11,560-ton Illinois-class battleships (BB-7, BB-8, and BB-9) in 1896.

On February 15, 1898, *Maine* was destroyed by a mysterious explosion while anchored in Havana. Only *Texas*, the three Indianas, and *Iowa* remained to fight the ensuing Spanish-American War. The battleships' outstanding wartime performance inspired unprecedented Congressional support for naval expansion, but US warship design remained an unstandardized, dysfunctional process. As late as the 1890s, American society remained fiercely isolationist, anti-military, and generally loathing of anything resembling European-style overseas adventurism. Thus, for political reasons, the first Congressional acts authorizing battleships straitjacketed designs with arbitrary size and range restraints no European government had the luxury to entertain.

The Navy Department's virtually autonomous engineering bureaus had been established by Congress in 1842. Each bureau answered only to the civilian (and thus wholly amateur) Navy Secretary; the system's parallel bureaucracies and entrenched decentralization derived from American paranoia of a powerful military officer class. To oversee ship design, in 1889 the Board on Construction was established, comprising the bureau chiefs and director of naval intelligence. The Board tended to be conservative and each chief inevitably represented his own bureau's interests. Initially, no line officers were included. This contentious "committee of committees" arrangement unsurprisingly produced several Frankenstein's monster designs of almost inexplicable flaws, triggering an inevitable backlash from line officers.

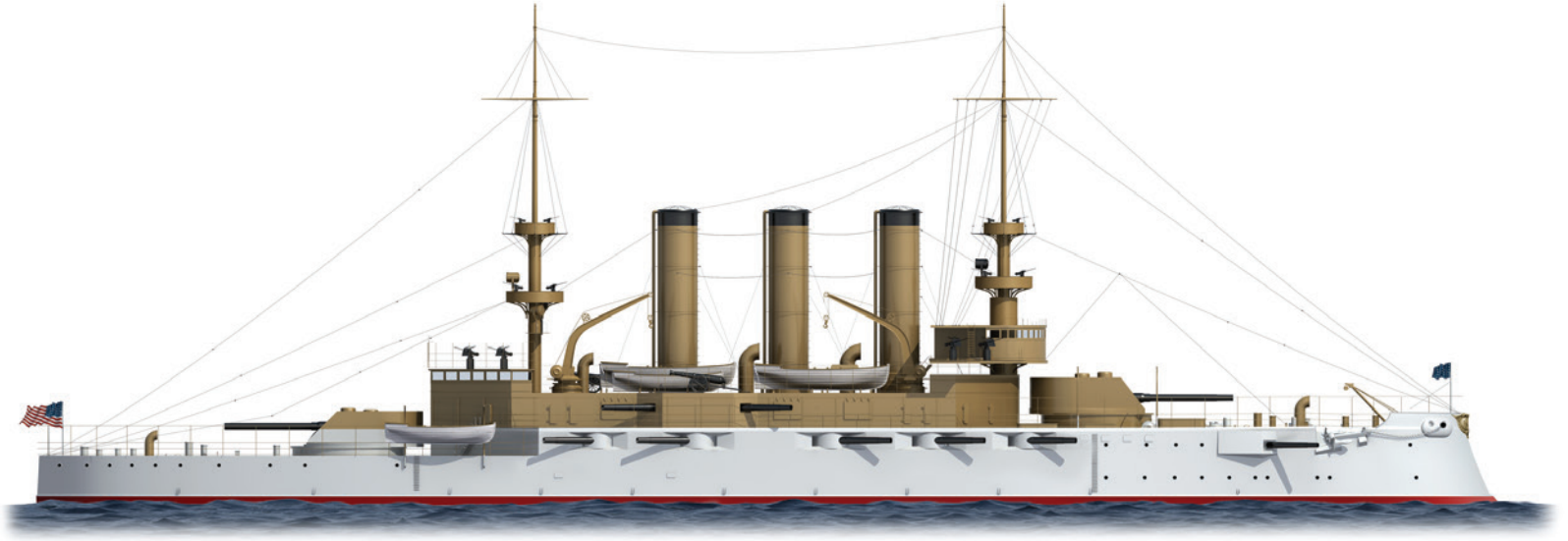
In November 1900, 42-year-old USN Lieutenant William S. Sims was transferred directly from his three-year Paris attaché mission to brand-new Kearsarge-class battleship *Kentucky*, en route from Gibraltar to China.

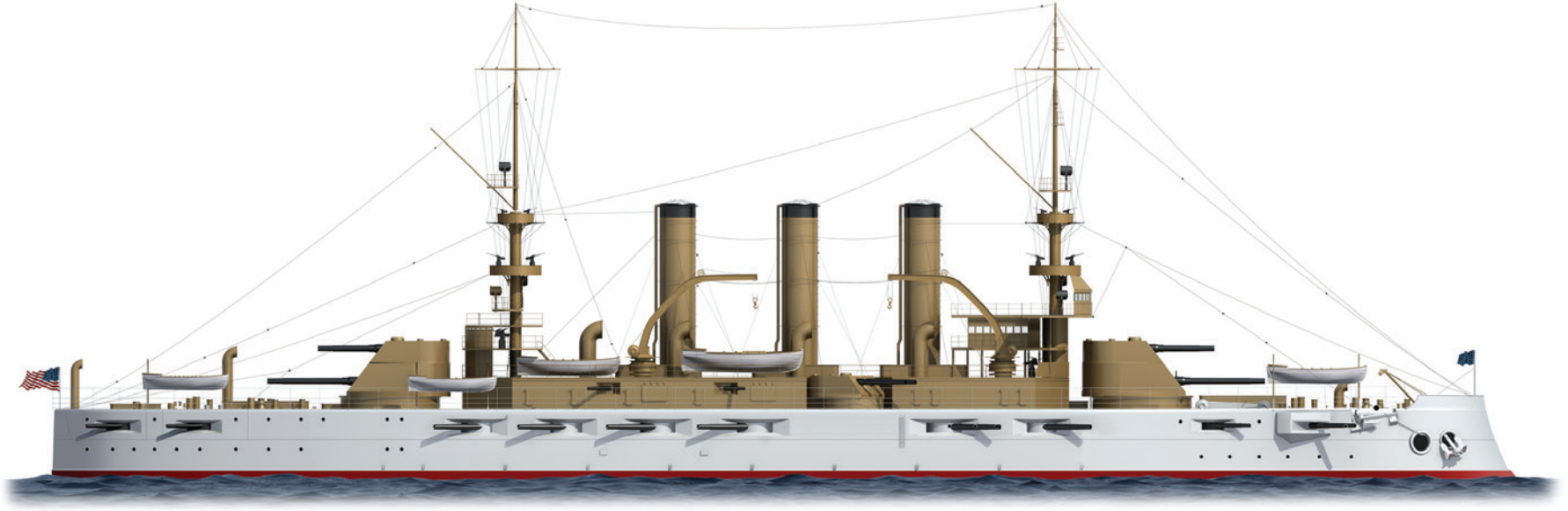
A

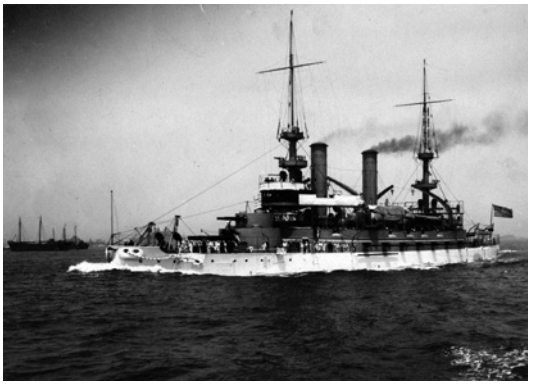
THE GREAT WHITE FLEET

Late nineteenth-century steel navies were typically painted in a nationally distinctive livery. White was a common summer or tropical color for many navies and merchant fleets, but was ultimately adopted by the USN on a permanent basis. US steel cruisers had been painted all-white by 1890, with the USN Squadron of Evolution nicknamed the "White Squadron." By 1895, the USN had settled on white hulls, yellow ocher superstructure, and (sometimes) black barrels, although the exact pattern seems left up to the captain's whim. Ironically, by 1907, bright peacetime schemes had already fallen out of fashion elsewhere. Displayed above is Maine-class battleship USS *Missouri* (BB-11) during the 1907–09 cruise of the Great White Fleet. *Missouri*'s after 12in turret is split horizontally between hull white and superstructure ocher. Her forward 12in turret, one deck higher, is entirely ocher.

Appearing below is Virginia-class battleship USS *Rhode Island* (BB-17), also in 1908 during the global cruise. The Virginias' flush deck allowed a clean horizontal distinction between white hull and ocher superstructure.







Kearsarge seen underway in a harbor in the early 1900s. Her extraordinarily low freeboard is difficult to ignore; even at moderate speed in sheltered water, *Kearsarge's* bow ornament is nearly awash. This photograph was likely taken at Portsmouth during *Kearsarge's* 1903 Europe visit. (NHHC NH 61238)

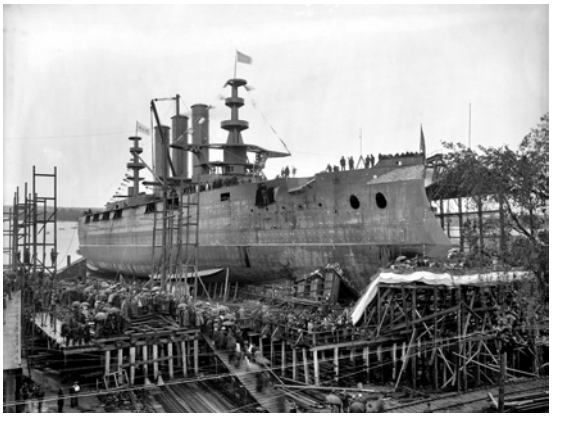
The outspoken Sims, by now intimately familiar with European battleship design, was appalled. "*Kentucky*," Sims thundered, "is not a battleship at all. She is the worst crime in naval construction ever perpetrated by the white race… It is almost incredible that white men who have reached the present stage of civilization could have built a ship like that." Among other issues, the Kearsarges' new, hydraulic 13in/35 main battery mounts required yawning 9.1sq ft gun ports, compared to 6.8sq ft on the Indianas. In characteristic fashion, Sims later recalled:

> *Kentucky* had a pyramidal gun mount that sat back so far that they had to cut a hole in the front face of the turret that was big enough for four 12-inch shells to come into her without touching anything. You could stand on the quarterdeck and look into that turret, and you could spit right down into the powder magazine… A little girl was being shown about the ship. She was eleven years old, and she walked over this gun deck where one gaping port after another was located, and she said, "I thought you told me these guns were protected by armor – but the armor is where the guns ain't."

In 1901, Lieutenant Sims sent Rear Admiral Francis T. Bowles, chief of the Bureau of Construction & Repair, a withering 59-page letter excoriating the American system of battleship design by Bureau engineers rather than by line officers such as himself. By January 1908, famed naval artist Henry Reuterdahl would publish "The Needs of Our Navy," an article in *McClure's* scathingly critical of American battleship design, which most suspected was ghostwritten by Sims. Led by Sims, a band of line officers increasingly mounted an insurrection against the Bureau system, finally claiming limited success several years into the dreadnought era.

Pre-dreadnought armor technology, meanwhile, had developed dramatically in the late nineteenth century, with advanced armor types often rendered obsolete just a few years after introduction. In 1886, Congress had required all US battleship armor and armament be developed and constructed in the United States. A crash program of private/federal cooperation had produced a fully modern, native armor plate industry by 1891. The first US battleships commissioned in 1895 were all fitted at least partially with American-developed Harvey nickel-steel, which had briefly been the best armor plate in the world. However, by 1893 the German firm Krupp had developed its own superior armor plate. The Krupp forging process resembled Harvey's, except Krupp infused its plate with 1 percent chromium, and also improved cementation by face-carburizing with methane-rich gas rather than Harvey's hot charcoal. Ten inches of the resulting Krupp cemented armor proved equivalent to 12 inches of Harvey nickel-steel. In late 1897, Carnegie and Bethlehem secured Krupp armor licensing. A scandal erupted that same year when it was discovered Carnegie and Bethlehem had been charging the Imperial Russian Navy $294/ton for unlicensed armor plate compared to $545/ton for the United States. Congress angrily demanded USN armor plate contracts be reduced to $300/ton. The contentious dispute significantly delayed the completion of several US battleship classes.

The Kearsarge and Illinois classes used cylindrical fire-tube (Scotch) boilers, but beginning with *Maine* (BB-10), US battleships employed water-tube boilers. The increased surface area and strength allowed much higher steam pressures. As before, coal-fired steam was routed to two vertical triple-expansion (VTE) reciprocating steam engines driving twin shafts. Beginning with *Kearsarge*, battleship VTEs were mounted on turned steel columns tied with steel truss rods, an arrangement continued through the USN's final VTE-powered battleship, 1916's *Oklahoma* (BB-37). The VTEs themselves employed three cylinders through *Maine* (BB-10). Beginning with *Missouri* (BB-11), four-cylinder VTEs were installed. While a four-cylinder VTE's initial high- and medium-pressure expansions were single cylinders as before, the third and final low-pressure expansion employed twin cylinders instead of a single large cylinder, reducing vibration. Exhaust steam was partially routed to evaporators, which distilled thousands of gallons of seawater a day into fresh water for drinking and feedwater for boilers. Saltwater, used to cool ice machines and evaporators, was routed to superstructure tanks for sanitary use.



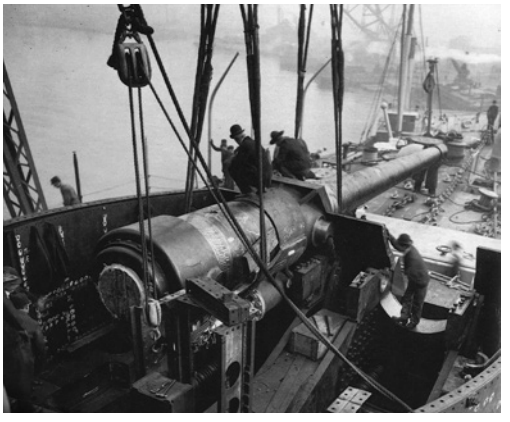
Virginia-class battleship *Georgia* at Maine's Bath Iron Works on her launching day, October 11, 1904. With functional boilers and masts and stacks already installed, *Georgia* was unusually far along when she was launched. Despite her name, *Georgia* ironically holds the distinction of being the eastern seaboard's most northerly built capital ship in US Navy history. (US Navy)

All battleship compartments contained sluices that drained standing water to main compartments for pumping overboard, especially vital in tropical climates where condensation proved rampant. Hundreds of drain gates and heavy brass valves could transfer water across the ship; crew-operated hand-pumps could also be connected for firefighting or damage control. The Maine class introduced a "Long Arm" automatic closing system for watertight doors; these, however, tended to malfunction in the filthy machinery spaces. Overall watertight integrity remained poor by modern standards. Like their foreign contemporaries, US pre-dreadnoughts lacked dedicated underwater protection aside from double bottoms and dubious cellulose cofferdams. The 1904–05 Russo-Japanese War would prove pre-dreadnoughts extremely vulnerable to mines and torpedoes.

Weapons

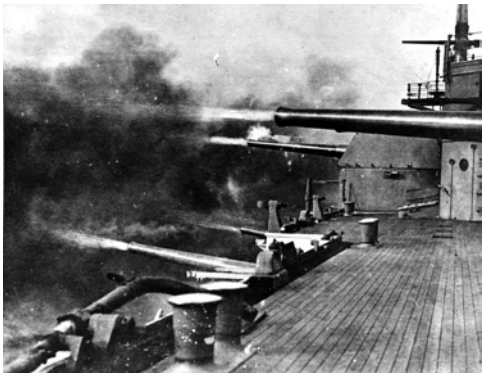
Pre-dreadnoughts were retroactively defined by their mixed-caliber gun batteries. Four heavy (12in or 13in) guns mounted in two centerline turrets were intended to penetrate enemy battleship armor, while rapid-firing secondary batteries wrecked superstructures and countered torpedo boats. Increasingly obsolescent mixed tertiary batteries of semiautomatic cannons and fully automatic machine guns functioned as anti-personnel weapons.

By 1905, most US naval guns were forged entirely at commercial steelworks rather than being finished at the Washington Navy Yard. Future battleship guns were first smelted in a huge ladle, poured into a mold, and then forged with hydraulic rams. Once cooled, the solid ingot was removed and roughly bored. It was then heated in a furnace, forged on a mandrel, and tempered several times. A lathe then refined the outside barrel. At this point large steel jackets and hoops slightly smaller than the barrel were heated. After expanding, they were dropped over the barrel still hot. While cooling they contracted, imparting tremendous strength. The barrel was



Workers install one of *Connecticut's* bow 12in/45 guns at the New York Navy Shipyard on January 31, 1906. The 12in/45 armed the last two US pre-dreadnought classes (Connecticut and Mississippi) as well as the first three US dreadnought classes (South Carolina, Delaware, and Florida) before being superseded by the Wyoming-class's 12in/50 in 1912. (US Navy)

USS *Kansas* seen firing a full broadside in 1910. The Connecticuts' seemingly redundant 7in/45 and 8in/45 were actually quite different weapons. Though technically bag-loaded, the 165lb 7in/45 shell was the heaviest, capable of being handled by a single man, making the 7in/45 the largest possible rapid-firing gun. The slower firing 8in/45's 260lb shell was retained to penetrate enemy battleships' medium armor. (NHHC NH 68297)



then re-bored, inspected for defects, and rifling was machine-cut inside. Holes and slots were filed in the breech for the addition of an interrupted thread Welin breechblock. After severe tests at the USN's Indian Head, Maryland, proving ground, the gun was ready for installation.

The USN first introduced smokeless powder in 1900, supplanting prismatic brown ("cocoa") powder. This cleaner, slower-burning propellant developed a smoother projectile acceleration, allowing a new and lighter, longer-barreled generation of US guns that produced dramatically increased power and accuracy. *Maine*'s new smokeless powder-powered 12in/40 Mark 3 guns, in fact, almost doubled the muzzle energy of *Iowa*'s 12in/35s and produced nearly half again more than *Kearsarge*'s 13in/35s. Brand-new caliber weapons were also developed, including the anti-torpedo 3in/50 of 1900. First installed aboard the Maine class, the 3in/50 was ultimately fitted to most US pre-dreadnoughts, including the Indianas in 1910–11. An anti-aircraft variant of the 3in/50 would be fitted in limited numbers late in the battleships' careers. Another brand-new gun was the 7in/45 of 1906. Although bag-loaded, the 7in/45 was effectively rapid-firing and, incidentally, the last gun developed for US pre-dreadnoughts.

Smokeless powder actually proved more powerful than predicted, even blowing apart several battleship gun barrels until a brand-new power curve could be calculated. Unfortunately, the new longer barrels were more likely to harbor residual propellant gases after firing, introducing the flareback phenomenon when the breech was opened to reload. When combined with US battleship turrets' single-stage shell hoists, catastrophic results were inevitable. On April 13, 1904, a flareback in *Missouri*'s Turret II ignited 350lbs of propellant, which quickly shot down the open ammunition hoist and ignited another 720lbs propellant in the handling room. The resulting tragedy killed 30 men. "It was only God's mercy that the ship was not lost," testified a *Missouri* officer. Then on April 14, 1906, a similar 13in turret explosion in *Kearsarge* killed seven, and on July 15, 1907, ten more sailors perished in an explosion in *Georgia*'s after 8in turret. An urgent crash program saw shell hoist shutters retrofitted, all open electrical equipment moved outside turrets, and a compressed air-jet mechanism developed that automatically cleared the gun bore upon the unscrewing of its breechblock.

Congress's 1886 mandate requiring that US warships be American-built inadvertently produced a peculiarity unique to US pre-dreadnoughts – the intermediate battery controversy. By 1892, French and British industry had produced powerful, rapid-firing 6in guns employing semi-fixed brass shell casings and quick-acting breechblocks. The more primitive American manufacturing base could only produce 4in rapid-firing guns. USN designers compensated by arming the Indiana class, *Iowa*, and the Kearsarge class with an additional 8in/35 "intermediate" battery that, while firing at far

lower rates, hit much harder (260lb shells) than 6in guns (105lb shells). Even so, 6in rapid-firing guns still delivered a much heavier total volume of fire. Always a crude stopgap, the 8in intermediate battery disappeared from US battleship designs as soon as American industry developed equivalent 6in rapid-firing guns (around 1896), beginning with the Illinois class.

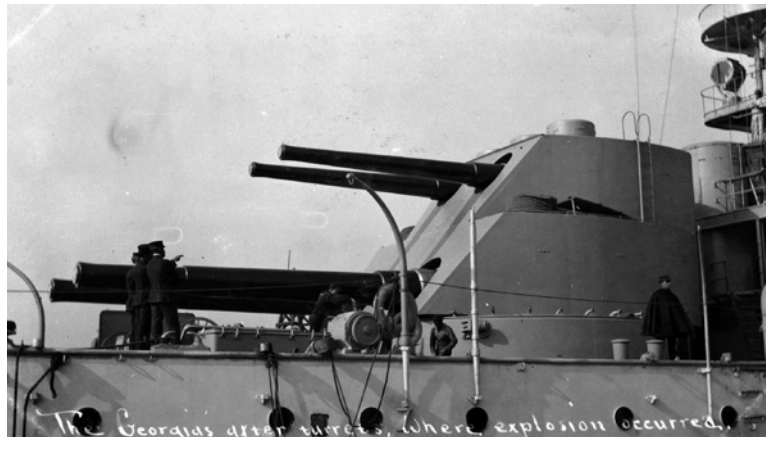
However, at the July 3, 1898, battle of Santiago, the US fleet duly annihilated the Spanish squadron off the coast of Cuba, despite scoring only 123 confirmed hits out of 9,433 rounds fired (1.3 percent). The 8in/35 had actually performed best, registering a still lamentable 13 hits in 319 attempts (4.1 percent). With so little modern combat experience to analyze, Santiago's precious few hours assumed an outsized importance. After skipping the Illinois and Maine classes, the 8in battery was controversially re-installed on the 1901-designed Virginias (in addition to a fully modern 6in rapid-firing battery). A later analyst explained, "Thus the postwar Virginia class reverted to an 8in gun (albeit a greatly improved one) which had originally been adopted to overcome US technological inferiority … just [when] that inferiority had been decisively overcome."

The most significant development affecting early 1900s pre-dreadnoughts was the period's astonishing advancements in naval gunnery. Even before the Spanish-American War, battleships were criticized as expensive white elephants vulnerable to swarms of cheap torpedo boats. It was this constant threat of the torpedo that drove battle ranges (that is, reliable accuracy) outward so dramatically around 1900 – from about 1,500 yards in 1898 to well over 6,000 yards by 1905. Meanwhile, improved loading methods drastically increased firing rates of existing bag-loaded guns.

USN 1897–1907 firing rates		
Gun	**1897**	**1907**
6in/40 BL	1rd/1.5min	7.3rds/min
6in/40 RF	1.5rds/min	7.6rds/min
8in/35	1rd/2min	2rds/min
12in/35	1rd/5min	1.2rds/min

In February 1901, Lieutenant William Sims presented *Kentucky*'s captain with a detailed list of *Kentucky*'s failings he expected to be forwarded to Washington. DC. Sims was instead transferred to monitor USS *Monterey* in Canton. Passing through Hong Kong, Sims befriended cruiser HMS *Terrible*'s Captain Sir Percy Scott, a fellow iconoclast and the Royal Navy's resident gunnery genius. Scott's superior, the equally brilliant and eccentric Admiral Sir Jackie Fisher, admitted, "I don't care if he drinks, gambles, and womanizes, he hits targets."

To the usual difficulties of shooting accurately on land, a sailor must add the roll and pitch of a ship at sea. Naval gunners traditionally waited until the ship's



A close-up of Virginia-class battleship USS *Georgia's* superposed after 8in and 12in turrets. The superposed turret in general was unquestionably the great design controversy dogging post-1898 US pre-dreadnought battleships. The 8in (upper) turret in the photo was the site of the July 15, 1907 explosion that killed ten men. The photograph itself was apparently taken sometime afterwards. (NHHC NH 101469)

Ohio (BB-12) shows off her gleaming 12in/40 Mark 3 guns mounted in her forward turret, c.1907–08. The Maine-class was the first US battleship class to employ the new, far more powerful smokeless powder, which allowed a longer barrel and consequently higher muzzle velocity, imparting increased accuracy and hitting power. (NHHC NH 101467)

motion apparently lined up on the target, pulled the lanyard, and hoped for the best. If the judged coincidence was slightly off, the ship's motion would fling the round over or short of the target. After observing a uniquely accurate gunner's method, Scott had trained all his gunners with the technique, which Scott called "continuous aim firing." Instead of waiting for the rocking gun to coincide with the target, the gunner constantly elevated his weapon up and down, keeping the gun trained on the target at all times while the ship rolled and pitched around the steady gun. *Terrible*'s improved accuracy was astonishing; in a 1901 practice Scott's gunners scored 114 hits from 1,500 yards on a target the size of *Kentucky*'s forward turrets.

With the zeal of the converted, Sims began a one-man crusade to improve American gunnery. Repeatedly pigeon-holed by USN bureaucracy, in late 1901, Sims wrote President Roosevelt directly regarding the deplorable state of US gunnery. Outraged, Roosevelt ordered Sims' reports distributed throughout the USN. In early 1902, Roosevelt personally observed a secret target-shoot of a condemned lightship. Five US battleships unleashed hundreds of rounds over several minutes, managing two hits at 1,500 yards. Roosevelt subsequently appointed Sims the USN's Inspector of Target Practice. Beginning in December 1902, Sims relentlessly visited each warship, lecturing for hours on Scott's methods. "Judas Priest," one junior officer exclaimed, "can't you talk about anything but gunnery?" Roosevelt authorized gunnery contests and prize money, transforming gun crews into teams and gunnery into a competitive sport. The USN installed improved telescopic sights, while newly adopted dotters and sub-caliber guns allowed gunners to practice without using expensive ammunition. By the 1904 Pensacola gunnery practice, the US fleet was registering 50 percent hits.

By 1907, two US battleships were experimenting with a mechanism sensitive enough to keep the heavy batteries on target mid-roll. A 1908 analysis reported "control through a wide range of rolling speeds, making it much easier to keep on the target than has been the case heretofore." By 1911, all US battleships had been fitted with the new elevating gear. Simultaneously, "single-key firing" was developed, which coordinated all guns to fire when the ship was stationary (at the top or bottom of its roll). Although all turrets retained the capability for local control, single-key firing supplanted continuous aim for heavy guns by 1914.

By 1902, the slow, 800-yard range 18in compressed air-powered Whitehead torpedoes had been made obsolete by increasing battle ranges. Within months, however, technological breakthroughs restored the torpedo's relevance. An alcohol heater increased the compressed air's power, while a one-stage turbine replaced the 18in torpedo's reciprocating engine. The General Board reported in mid-1903 that the torpedo had so improved

in range, speed, and accuracy that it was again a threat at expected battle range, now about 3,000 yards. All new US battleships were either built or retrofitted with 21in torpedo tubes.

Heavy guns			
Type	**Projectile**	**Muzzle velocity**	**Firing rate (nominal)**
13in/35	1,130lb AP	2,100ft/sec	1rd/min
12in/40	870lb	2,800ft/sec	2rds/min
12in/45	870lb	2,800ft/sec	1–2rds/min
Medium guns			
Type	**Projectile**	**Muzzle velocity**	**Firing rate (nominal)**
8in/45	260lb AP	2,750ft/sec	1–2rds/min
8in/35	260lb AP	2,100ft/sec	2–3rds/min
7in/44	165lb AP	2,700ft/sec	4rds/min
6in/50	105lb AP	2,800ft/sec	6rds/min
6in/40	105lb AP	2,150ft/sec	7.3rds/min
5in/40	50lb AP	2,300ft/sec	12rds/min
3in/50	13lb	2,700ft/sec	15–20rds/min
Light guns			
Type	**Projectile**	**Muzzle velocity**	**Firing rate (nominal)**
Hotchkiss/Driggs-Schroeder 6-pdr (57mm)	6lb	2,240ft/sec	20rds/min
Hotchkiss/Driggs-Schroeder 3-pdr (47mm)	3.3lb	2,100ft/sec	20–25rds/min
Hotchkiss/Driggs-Schroeder 1-pdr (37mm)	1.1lb	2,000ft/sec	25rds/min
Maxim-Nordenfelt 1-pdr (37mm) autocannon	1.1lb	1,818ft/sec	300rds/min
Gatling .45-70 revolving gun	405-grain	2,020ft/sec	1,500rds/min
Colt-Browning M1895 6mm machine gun	112-grain	2,560ft/sec	450rds/min
Colt-Browning M1895 .30-40 machine gun	100-grain	2,898ft/sec	450rds/min

Self-propelled torpedoes						
Type	**Weight (lb)**	**Length**	**Warhead**	**Propulsion**	**Range (yards)**	**Speed (knots)**
Whitehead Mark 2 18in torpedo	1,232	16ft 5in	132lb wet guncotton	1,500psi compressed air into 3-cylinder reciprocating engine	1,500	28.5
Bliss-Leavitt Mark 1 21in torpedo	1,500	16ft 5in	200lb wet guncotton	Alcohol-fired heated air into single-stage turbine	3,500–4,500	27

Enter the dreadnought

As range, accuracy, firing rates, and hitting power increased dramatically after 1900, the main battery emerged decisive. Smaller guns hadn't merely become redundant; their gun blast, smoke, and shell splashes suddenly interfered with the decisive main battery. The logical solution – the "all-big gun" battleship – formed simultaneously among the major navies. New battleships would carry only a heavy main battery for destroying enemy battleships, along with a rapid-firing tertiary battery for repelling torpedo attacks. The first such battleship, Britain's HMS *Dreadnought*, was completed in December 1906.

Dreadnoughts did not suddenly make mixed-battery battleships obsolete, as commonly asserted – the battleship's essential tactical attributes of armor penetration, protection, speed, and range remained unaffected. The quantum leap was the sudden doubling of decisive firepower available from a single hull – both HMS *Dreadnought* and USS *Michigan* (BB-27) wielded an eight-gun 12in broadside against just four from a pre-dreadnought. Battle-line power, however, is determined not by big guns per hull but by *total* big guns. So long as a battle line wielded more big guns than its opponent, it did not matter where those big guns came from. Until the more firepower-efficient dreadnoughts could replace them one-by-one, existing pre-dreadnoughts remained essential to modern battle fleets throughout the world.

THE BATTLESHIPS

Kearsarge class (1900)

The Indianas had been ordered in 1890, followed by *Iowa* in 1892. However, the 1893 economic crash meant no new battleships were approved in 1893 or 1894. On March 2, 1895, Congress authorized two new "seagoing coastline battleships … of about 10,000 tons." Standing US law required battleships to be named after "the States of this Union," but upon request Congress mandated BB-5 to be named *Kearsarge*, after the beloved Civil War sloop that had recently foundered. *Kearsarge* would be the only one of the United States' 73 battleships not named after a state. *Kearsarge*'s sister was christened *Kentucky* (BB-6).

After revealing 1895 tests, the Kearsarges reverted to the Indianas' main battery of four 13in/35 guns rather than *Iowa*'s 12in/35s. The heavier 13in/35s limited the intermediate battery to four 8in/35 guns, but Kearsarges' casemated broadside secondary battery of 14 5in/40 RF guns proved superior to both *Iowa*'s 4in/40 RF guns and the Indianas' slow-firing 6in/40 BL guns. The Kearsarges' mixed tertiary battery comprised 20 6lb guns, eight 1-pdrs, and four .30-caliber Colt-Browning machine guns. Four 18in Whitehead torpedo tubes were also mounted.

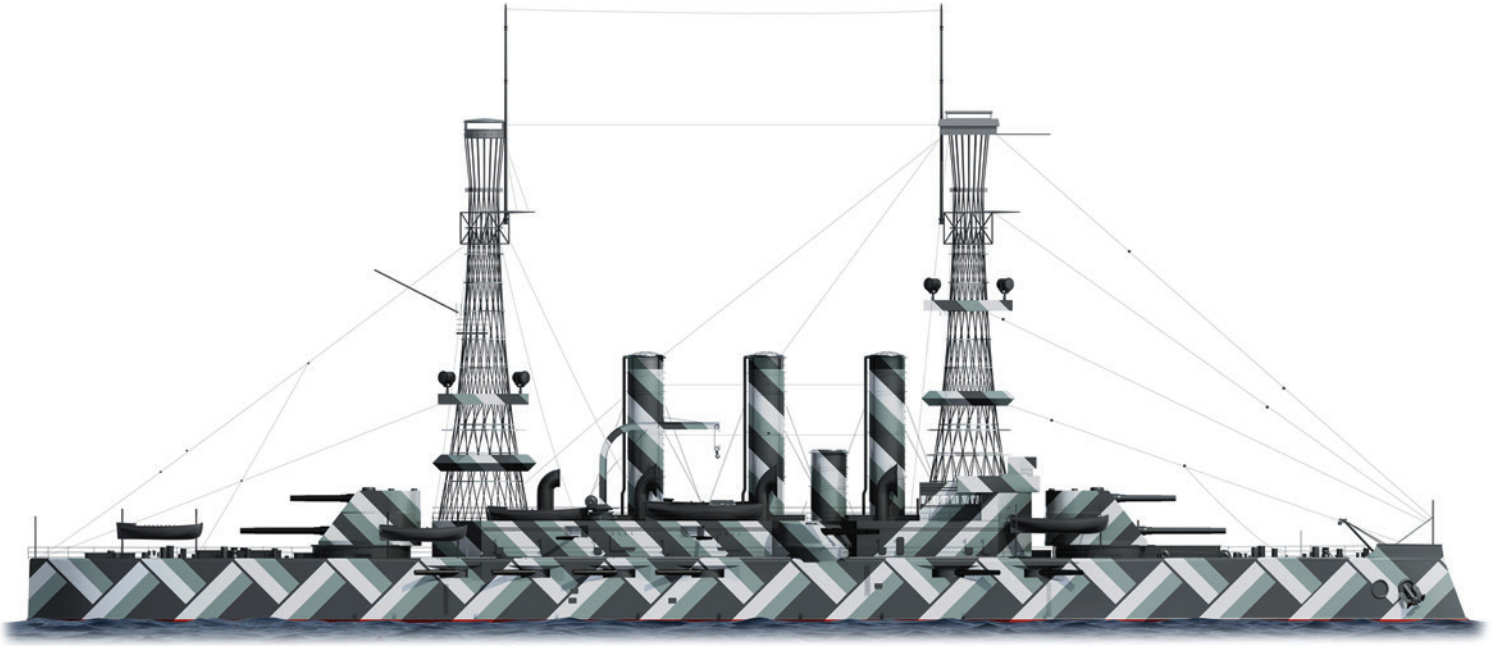
Siting the 8in battery proved highly contentious. Maximum firing arcs demanded centerline 8in guns either in superfiring turrets cantilevered above the 13in turrets (preferred by the Bureau of Construction & Repair) or Ensign Joseph Strauss's superposed turrets fixed directly atop the 13in turrets (preferred by the Bureau of Ordnance). An ad hoc board selected superposed turrets based on two perceived advantages: they were not expected to cause muzzle blast interference issues, and their protection,

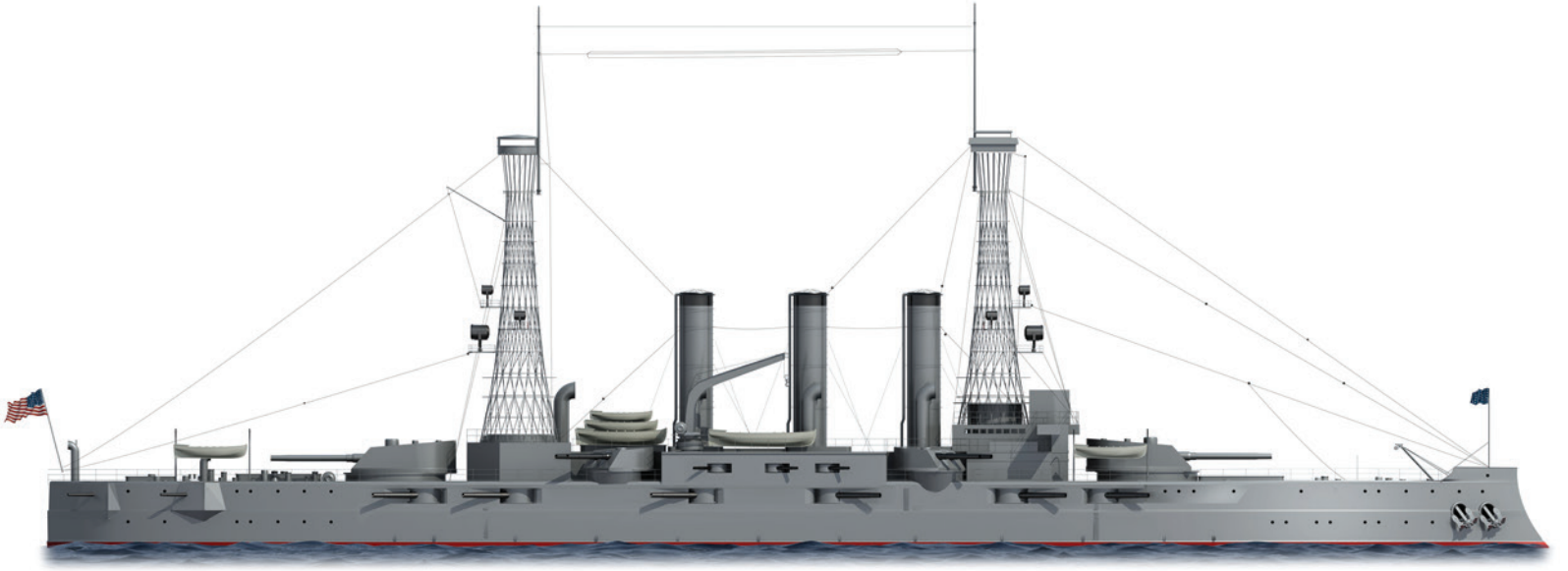
B

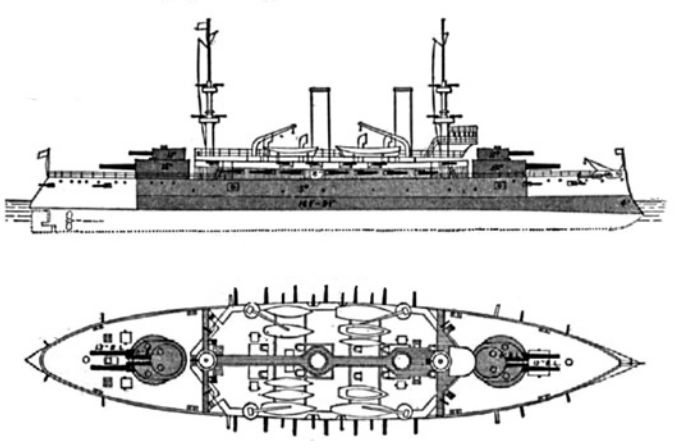
WORLD WAR I

Few US pre-dreadnought battleships deployed overseas during World War I, but two of those that did are seen here. The USN was more enthusiastic than the Royal Navy about applying range-confusing dazzle schemes to battleships; possibly the most interesting application is seen above. Virginia-class battleship USS *Nebraska* (BB-14) is viewed in July 1918 sporting the experimental "Watson/Norfolk Scheme 3" camouflage at Rio de Janeiro. Her profile is noticeably modified from Virginia-class battleships of 1908.

Connecticut-class battleship USS *New Hampshire* (BB-25) is seen below in September 1918, when she began escorting North Atlantic convoys. Like *Nebraska*, *New Hampshire* has been heavily modified since 1908. A reduced bridge and the addition of cage masts are the most visible alterations. *New Hampshire* is in standard haze gray.







Kearsarge was originally designed with an intermediate battery of eight 8in guns, but Congress's arbitrary 10,000-ton displacement limit slashed this in half, thus inspiring the infamous double-story turrets. *Kearsarge's* 5in secondary battery, meanwhile, was inspired by the 138.6mm (5.5in) broadside casemates of the French Charlemagne-class battleships. (Author's collection)

logistics, and control could be consolidated into the existing 13in turret. However, a critical shell-hit or machinery failure could wipe out half the ship's heavy battery. Moreover, the 8in guns could not engage targets independently of the 13in guns (although Strauss argued the turrets' 30-second training period allowed the 8in guns to fire at separate targets in between 13in firing cycles). The two-story turrets also weighed 728 tons compared to *Iowa*'s 432 tons; total trunnion firing pressure rose to 506 tons from *Iowa*'s 220 tons.

The superposed turret decision triggered a series of cascading engineering issues. A strengthened hull supported the increased weight and firing pressure, and a lowered main deck counteracted the higher center-of-gravity, but the Kearsarges consequently rode low, their 13in main guns just 20ft above the waterline. Bows became awash in heavy seas, impairing forward turret operation and rendering the casemated 5in/40 battery useless. The Kearsarges nevertheless proved stable gun platforms.

The Kearsarges employed a 16.5in Harvey belt tapering to four inches at the bow. Triangular armor 10–12in thick connected the ends of the belt with the sloping protective deck. Five-inch side armor extended to the main deck. Six inches of superstructure armor shielded the casemated 5in/40 broadside battery. The 13in turrets were protected by up to 17in of armor.

Despite Congress requiring that one be built on the West Coast, both Kearsarges were built side-by-side at Virginia's Newport News. *Kearsarge* and *Kentucky* were commissioned on February 20 and May 15, 1900, respectively the United States' first post-Spanish-American War battleships. The many design alterations had pushed the Kearsarges' contracted completions back 13 months. The Kearsarges displaced 11,540 tons. *Kearsarge* made 18.8 knots at 11,954ihp, while a maximum coal bunkerage of 1,591 tons provided a 5,316nm radius at 10 knots. Though small, slow, wet, and riven with design flaws, the Kearsarges were nevertheless powerfully armed and armored.

Although *Kentucky* was permanently decommissioned in 1920 and scrapped in 1923, *Kearsarge* was converted into a crane ship with a 250-ton lifting capacity at the Philadelphia Navy Yard and recommissioned as *Kearsarge* on August 5, 1920. She was renamed *Crane Ship No. 1* (AB-1) on November 6, 1941, to free her name for Essex-class carrier CV-12 (later renamed *Hornet*). After serving in World War II, *Crane Ship No. 1* was decommissioned and scrapped in 1955.

Kearsarge-class specifications	
Length:	368ft
Beam:	72ft 2.5in
Draft:	23ft 6in
Displacement:	11,540 tons
Propulsion:	Two VTE engines, three double-ended and two single-ended fire-tube boilers
Speed:	18.8 knots at 11,954ihp
Range:	Radius 5,316nm at 10 knots
Coal capacity:	1,591 tons
Armament:	Four 13in/35 BL rifles in two double turrets (240 rounds)
	Four 8in/35 BL rifles in two superposed turrets (500 rounds)
	14 5in/40 RF guns
	20 6-pdrs, eight 1-pdrs, four .30-caliber M1895
	Four above-surface 18in Whitehead torpedo tubes
Protection:	Belt: 16.5in
	Sides: 5in
	Deck: 3in
	Conning tower: 10in
	Main turrets 17in, barbettes 15in
Complement:	38 officers, 548 enlisted
Cost:	$5.0 million

Kearsarge-class construction							
Ship		**Built at**	**Yard**	**Laid down**	**Launched**	**Commissioned**	**Fate**
BB-5	***Kearsarge***	Newport News, VA	Newport News Shipbuilding	Jun 30, 1896	Mar 24, 1898	Feb 20, 1900	Sold Aug 9, 1955
BB-6	***Kentucky***	Newport News, VA	Newport News Shipbuilding	Jun 30, 1896	Mar 24, 1898	May 15, 1900	Sold Mar 24, 1923

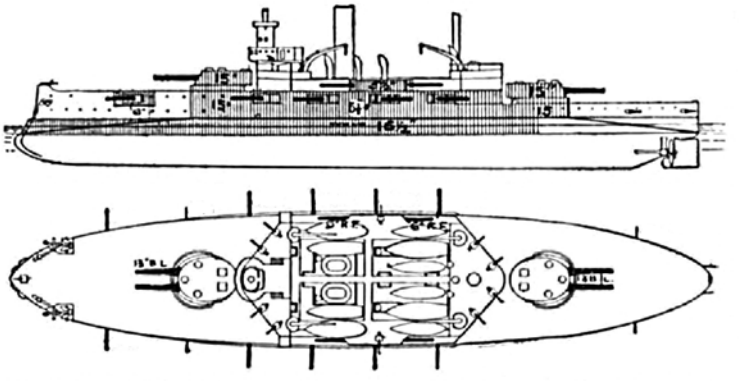
Illinois class (1900–01)

On June 10, 1896, Congress authorized three additional "seagoing coastline" battleships. *Illinois* (BB-7), *Alabama* (BB-8), and *Wisconsin* (BB-9) were to mount the heaviest possible armament and armor on 11,000 tons. The newly appointed Walker policy board observed armor and ordnance trials, and additionally toured the under-construction *Massachusetts* (BB-2) and the underway *Indiana* (BB-1).

At 368ft long and 11,565 tons normal displacement, *Illinois* was virtually identical in size to *Kearsarge*, but the classes were nevertheless quite different. Like *Iowa*, *Illinois* employed a long, high forecastle deck stretching three-quarters of her length; *Illinois*' 13in/35 main guns, in new elliptical sloped-face turrets, were mounted 26ft above the waterline, 9in higher than *Iowa*'s. Improved gun mounts eliminated the Kearsarges' gun port issues Sims would later rail against. *Illinois*' secondary and tertiary batteries comprised 14 6in/40 RF guns, 16 6-pdrs, and six 1-pdrs. With a rapid-firing secondary battery finally equal to European battleships, the intermediate 8in/35 battery disappeared. All three Illinois-class battleships were designed as flagships, with admirals' spaces fitted on the after bridge. With a relatively stiff roll, the Illinois-class battleships were stable gun platforms and judged superior to the Indianas and Kearsarges.

Harvey nickel-steel armored the Illinois class, as domestic production issues quashed plans to introduce the newly licensed Krupp armor. The

OPPOSITE
Crane ship *Kearsarge* undergoing repairs at Boston, October 3, 1925. The USN added 10ft hull blisters to promote stability and buoyancy in *Kearsarge's* new role; these are quite apparent in the photo. *Kearsarge* ironically spent much of World War II helping build and repair US battleships, often lifting their main guns into place. (NHHC NH 69051)



The Illinois-class employed a 7.5ft-wide Harvey nickel-steel main belt on the waterline, while side armor of 5.5in protected the berth deck and main deck. Six-inch-thick armor protected the 6in/40 guns, which were divided amidships by 60lb nickel-steel splinter bulkheads. (Author's collection)

Illinois' armor scheme was virtually identical to the Kearsarges. Beginning with the Illinois class, US battleship armor belts would be designed for a loaded waterline height of two-thirds coal capacity, rather than the previous one-quarter that typically left the Indianas' belts submerged.

Eight single-ended 180psi fire-tube boilers delivered steam to two VTE engines. The boilers were arranged in four watertight compartments, with four each on the port and stern sides. Exhaust was trunked into two abreast funnels, similar to contemporary British design but unique in US battleships. All three vessels significantly exceeded their designed 10,000ihp. Designed speed was 16 knots, but all exceeded 17 knots in trials. Total *Illinois* coal bunkerage was 1,400 tons, producing a 4,447nm steaming radius at 10 knots.

Lead ship *Illinois* was assigned to Virginia's Newport News, already building *Kearsarge* and *Kentucky*. Her construction delayed, *Illinois* was both laid down and commissioned last. British sources consequently refer to the Illinois class as the Alabama class.

Illinois' fire-tube boilers were replaced by eight Mosher water-tube boilers in 1912. In 1921, *Illinois* was allocated to the New York Naval Militia, being demilitarized and turned into a training center moored at a New York City pier. On January 8, 1941 *Illinois* was designated IX-15 and renamed *Prairie State* to free her name for the never-completed Iowa-class battleship BB-65. *Prairie State* was struck in 1955 and scrapped in 1956.

Illinois-class specifications	
Length:	368ft
Beam:	72ft 3in
Draft:	23ft 6in
Displacement:	11,565 tons
Propulsion:	Two VTE engines, eight single-ended 180psi fire-tube boilers
Speed:	17.45 knots at 12,898ihp
Range:	Radius 4,447nm at 10 knots
Coal capacity:	1,400 tons
Armament:	Four 13in/35 BL rifles in two double turrets (240 rounds)
	14 6in/40 RF guns
	16 6-pdrs, seven 1-pdrs, four .30-caliber M1895
	Four above-surface 18in Whitehead torpedo tubes
Protection:	Belt: 16.5in
	Sides: 5.5in
	Deck: 3in
	Conning tower: 10in
	Main turrets 14in, barbettes 15in
Complement:	40 officers, 496 enlisted
Cost:	$4.1 million

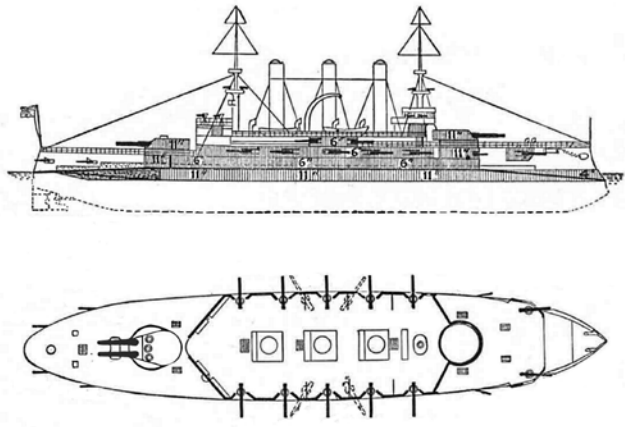
Illinois-class construction							
Ship		**Built at**	**Yard**	**Laid down**	**Launched**	**Commissioned**	**Fate**
BB-7	***Illinois***	Newport News, VA	Newport News Shipbuilding	Feb 10, 1897	Oct 4, 1898	Sep 16, 1901	Sold 1956
BB-8	***Alabama***	Philadelphia, PA	William Cramp & Sons	Dec 1, 1896	May 18, 1898	Oct 16, 1900	Sunk as bombing target Sep 27, 1921
BB-9	***Wisconsin***	San Francisco, CA	Union Iron Works	Feb 9, 1897	Nov 26, 1898	Feb 4, 1901	Sold Jan 26, 1922

Maine class (1902–04)

On May 4, 1898, Congress authorized three new 11,000-ton battleships, requiring one be named *Maine*, after the second-class battleship that had exploded in Havana on February 15. The Maines were originally intended as *Illinois* repeats, but Engineer-in-Chief George Melville insisted on higher speed. The Maines' final design introduced many new technologies, including Krupp armor, water-tube boilers, four-cylinder VTEs, automatic watertight doors, and the newly developed, harder-hitting smokeless powder guns. They bore a striking resemblance to the Imperial Russian battleship *Retvizan*, built virtually side-by-side to *Maine* (BB-10) at Philadelphia's Cramp shipyard. *Missouri* (BB-11) was laid down at Virginia's Newport News, while *Ohio* (BB-12) was the third and final battleship built by San Francisco's Union Iron Works. All were finished well past their contracted completion dates in summer 1901, with *Ohio* commissioned 40 months late in October 1904.

Designed for smokeless powder propellant, the Maines' revolutionary new armament provided an enormous leap in power and accuracy. Four 12in/40 Mark 3 guns comprised the main battery. Sixteen new 6in/50 rapid-firing guns provided the secondary battery, with six 3in/50 guns for torpedo defense. Two underwater 18in Whitehead torpedo tubes were mounted forward of Turret I.

The introduction of stronger Krupp armor allowed an 11in main belt, with the usual 4in bow extension. Casemate armor increased to 6in. The Maines' protection scheme otherwise resembled the Illinois class. The Maines were overweight at 12,370 tons, but a fine hull plan allowed 18 knots on 15,603ihp. *Maine* was powered by two three-cylinder VTE engines, while *Missouri* and *Ohio* were powered by two four-cylinder VTE engines. The Maines' larger, more powerful machinery meant they were the first US battleships fitted with three funnels. *Maine*'s radius was 4,900nm at 10 knots, with a coal capacity of 1,800 tons. Despite their new water-tube boilers, the Maines were notorious "coal-eaters." While *Missouri* and *Ohio* were fitted with 12 large-tube Thornycroft boilers, *Maine* employed 24 small-tube Niclausse boilers installed over Melville's objections. These proved a failure. Rear Admiral Robley Evans reported *Maine* burned 30 tons of coal per day sitting in port, acidly noting *Maine* "had no economical speed."



The increased strength of the Maines' new Krupp armor allowed similar protection as previous classes, but for less weight. The Maines' 20.5 percent displacement devoted to protection was the least of any US pre-dreadnought class; the remaining classes were between 24.1 percent (Virginia-class) and 26.9 percent (Indiana-class). (Author's collection)

Maine-class specifications	
Length:	388ft
Beam:	72ft 2.5in
Draft:	23ft 6in
Displacement:	12,370 tons
Propulsion:	(Maine) Two 3-cylinder VTE engines, 24 Niclausse boilers
	(Missouri, Ohio) Two 4-cylinder VTE engines, 12 Thornycroft boilers
Speed:	18 knots at 15,603ihp
Range:	Radius 4,900nm at 10 knots
Coal capacity:	1,800 tons
Armament:	Four 12in/40 BL rifles in two double turrets (240 rounds)
	16 6in/50 RF guns
	Six 3in/50 guns
	Eight 3-pdrs, six 1-pdrs, two .30-caliber M1895 machine guns
	Two submerged 18in Whitehead torpedo tubes
Protection:	Belt: 11in
	Sides: 6in
	Deck: 4in
	Conning tower: 10in
	Main turrets 12in, barbettes 12in
Complement:	34 officers, 614 enlisted
Cost:	$5.4 million

Maine-class construction

Ship		Built at	Yard	Laid down	Launched	Commissioned	Fate
BB-10	***Maine***	Philadelphia, PA	William Cramp & Sons	Feb 15 1899	Jul 27 1901	Dec 29 1902	Sold Jan 26 1922
BB-11	***Missouri***	Newport News, VA	Newport News Shipbuilding	Feb 7 1900	Dec 28 1901	Jan 12 1903	Sold Jan 26 1922
BB-12	***Ohio***	San Francisco, CA	Union Iron Works	Apr 22 1899	May 18, 1901	Oct 4 1904	Sold Mar 24 1923

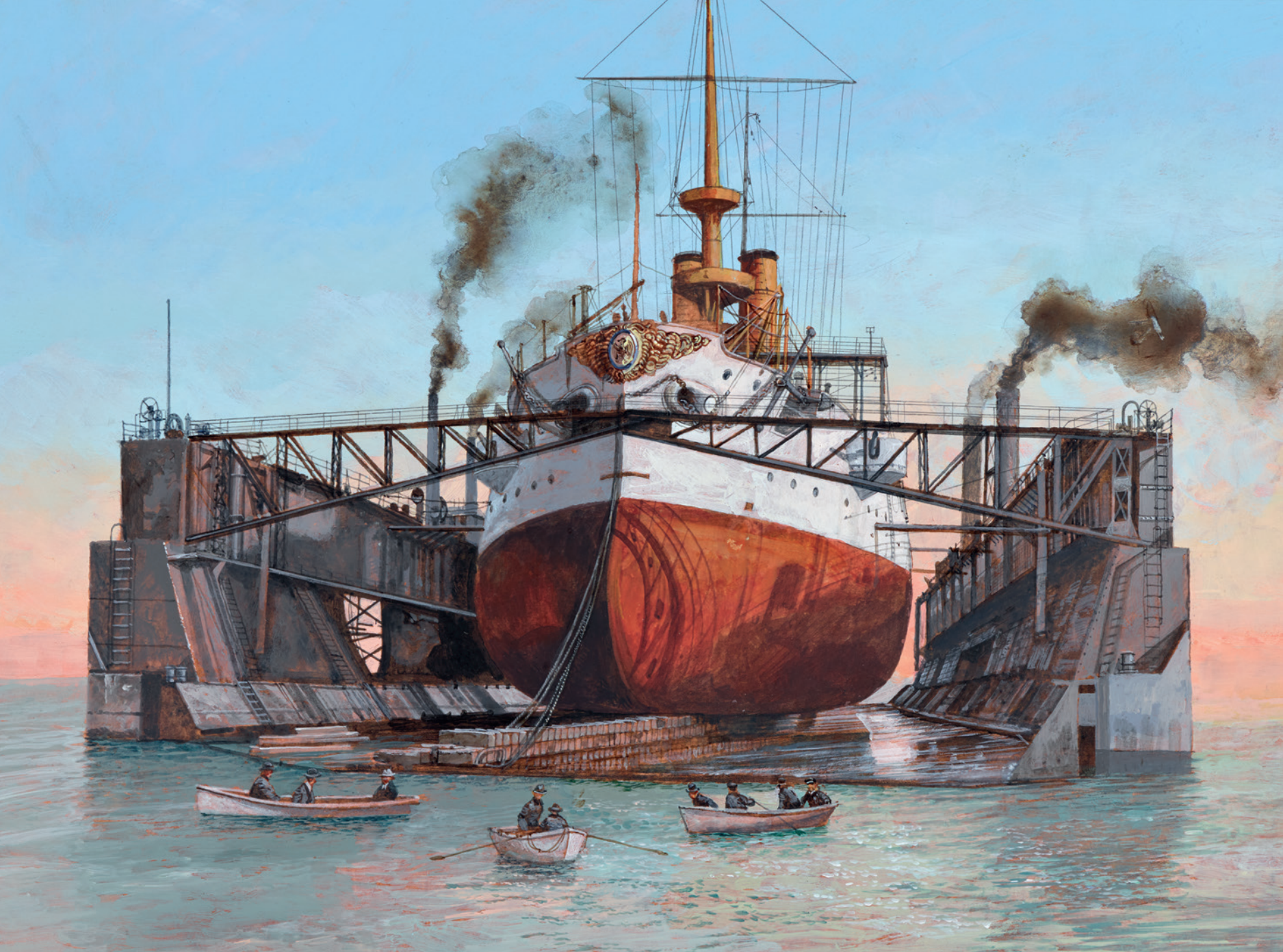
Virginia class (1906–07)

Congress authorized three new 13,500-ton battleships on March 3, 1899, followed by two more on June 7, 1900. After 1898, the politically motivated coastline battleship was dead; all five battleships (BB-13 through BB-17) would be of "the highest practicable speed and great radius of action." The new class repeated the Maines' heavy battery of four 12in/40 guns, and were the first battleships designed with the benefit of the Washington Navy Yard model basin, resulting in an improved hull form. A plan to sheathe

C

BATTLESHIP USS *ILLINOIS* (BB-7) AT ALGIERS, LOUISIANA, JANUARY 10, 1902

The new battle fleet demanded new infrastructure. In November 1901, the steel floating drydock *YFD-2* was completed and commissioned at Sparrows Point, Maryland. At 525ft long, *YFD-2* was capable of lifting 18,000 tons (the most in the world) for service at New Orleans' Algiers naval station, where local bayou geology was not conducive to excavating graving docks. On November 20, 1901, newly commissioned battleship USS *Illinois* (BB-7) was dispatched from the Chesapeake to Louisiana to test *YFD-2*. The battleship and auxiliary drydock are seen during their January 10, 1902 test lift. Black coal smoke can be seen coming from *YFD-2*, the result of steam-powered pumps. After successfully testing *YFD-2*, battleship *Illinois* returned to Newport News, Virginia.



Battleship *Virginia* tears through the Atlantic during late 1905 sea trials. Although the Virginias were the most seaworthy US battleship class yet, they still lacked sufficient freeboard. During a 1907 event, *Virginia* shipped 120 tons of water into her forward 12in gun turret. (US Navy)

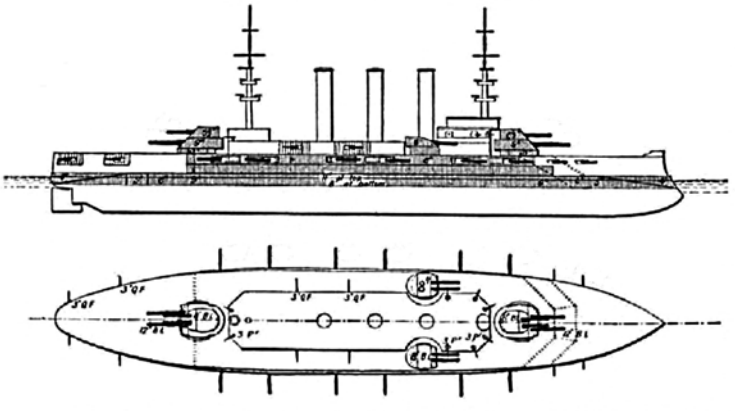
the 1899-authorized hulls in anti-fouling copper plating was ultimately dropped.

Santiago, of course, resurrected the 8in battery controversy along with the associated superposed turret issues. The Board on Construction voted four to one in favor of four quadrilateral 8in turrets rather than two superposed turrets and two waist turrets. Lacking unanimity, eight more members were appointed, which suddenly voted seven to five for superposed/waist turrets, with the thirteenth member recommending three battleships with superposed turrets and two battleships without. Chief constructor Rear Admiral Philip Hichborn feared "further temporizing" would be "detrimental to the Navy," arguing one design or the other simply must be better, noting, "To divide these vessels between two types is to definitely advertise to the world that although we have completed two superposed turret vessels [*Kearsarge* and *Kentucky*] we do not know whether or not they are better than if they had been built with separate turrets." A third board was then convened in 1901, which voted ten to two in favor of eight 8in/45 guns in two superposed turrets and two waist turrets. After yet further debate, on February 5, 1901 this became the final intermediate battery scheme for the whole class. Twelve casemated 6in/50 guns provided the secondary battery, with 12 3in/50 guns mounted as anti-torpedo armament. Tubes for the new 21in torpedoes were added during construction.

On March 7, 1901, to match certain shipyards' home states, the USN swapped names between BB-13 *New Jersey* and BB-16 *Virginia*, as well as between BB-14 *Pennsylvania* and armored cruiser ACR-4 *Nebraska*. Maine's Bath Iron Works laid down BB-15 *Georgia* on August 31, 1901, while construction began on the remaining four battleships between April and July 1902. Keels were barely laid before the backlash against superposed turrets resurged. Just months after the renamed Virginias' commissionings, the USN's official July 1, 1907 *Annual Report* condemned superposed turrets unsparingly.

At 14,980 tons, *Virginia* was over 2,600 tons heavier than *Maine*, slightly beamier, and 47ft longer. The Virginias' armor scheme was slightly modified from previous classes. The 11in Krupp armor belt extended 9in deeper than on the Maines. The standard armor belt bow extension was accompanied by a thinner "end belt" protecting the stern, while casemate protection was more extensive. A centerline watertight bulkhead extended throughout the hull, but was criticized as making *Virginia* more prone to capsize. Twenty-four improved Niclausse boilers were installed aboard *Virginia* and *Georgia*. In 1916, these were replaced with the 12 Babcock & Wilcox boilers employed by *Nebraska*,

The Virginia-class's protective deck sloped down along the length of the hull and connected to her main waterline belt at the belt's bottom, rather than its top. The angled deck offered increased protection against the era's typically flat projectile fire. This arrangement had been previously introduced in Europe but was a first for American battleships. (Author's collection)



New Jersey, and *Rhode Island*. Three VTEs on triple shafts was briefly considered, but ultimately the Virginias were powered by the standard pair of four-cylinder VTEs on twin shafts, which delivered 22,841ihp. At 19 knots the Virginias were the fastest US battleships yet. Despite their tortured development, the Virginias generally proved fine ships.

Virginia-class specifications	
Length:	435ft
Beam:	76ft 2.5in
Draft:	23ft 9in
Displacement:	14,948 tons
Propulsion:	Two 4-cylinder VTE engines, (*Virginia, Georgia*) 24 modified Niclausse boilers
	(*Nebraska, New Jersey, Rhode Island*) 12 Babcock & Wilcox 265psi boilers
Speed:	19 knots at 22,841ihp
Range:	Radius 4,920nm at 10 knots
Coal capacity:	1,900 tons
Armament:	Four 12in/40 BL rifles in two double turrets (240 rounds)
	Eight 8in/45 BL rifles (1,000 rounds)
	12 6in/50 RF guns
	12 3in/50 RF guns
	12 3-pdrs, two .30-caliber M1895 machine guns
	Four submerged 21in Whitehead torpedo tubes
Protection:	Belt: 11in
	Sides: 6in
	Deck: 3in
	Conning tower: 9in
	Main turrets 12in, barbettes 10in
Complement:	40 officers, 772 enlisted
Cost:	$6.6 million

Virginia-class construction							
Ship		**Built at**	**Yard**	**Laid down**	**Launched**	**Commissioned**	**Fate**
BB-13	***Virginia***	Newport News, VA	Newport News Shipbuilding	May 21 1902	Apr 5 1904	May 7 1906	Sunk as bombing target Sep 5 1923
BB-14	***Nebraska***	Seattle, WA	Moran Brothers Shipbuilding	Jul 4 1902	Oct 7 1904	Jul 1 1907	Sold Nov 30 1923
BB-15	***Georgia***	Bath, ME	Bath Iron Works	Aug 31 1901	Oct 11 1904	Sep 24 1906	Sold Nov 1 1923
BB-16	***New Jersey***	Quincy, MA	Fore River Shipyard	Apr 2 1902	Nov 10 1904	May 12 1906	Sunk as bombing target Sep 5 1923
BB-17	***Rhode Island***	Quincy, MA	Fore River Shipyard	May 1 1902	May 17 1904	Feb 19 1906	Sold Nov 1 1923

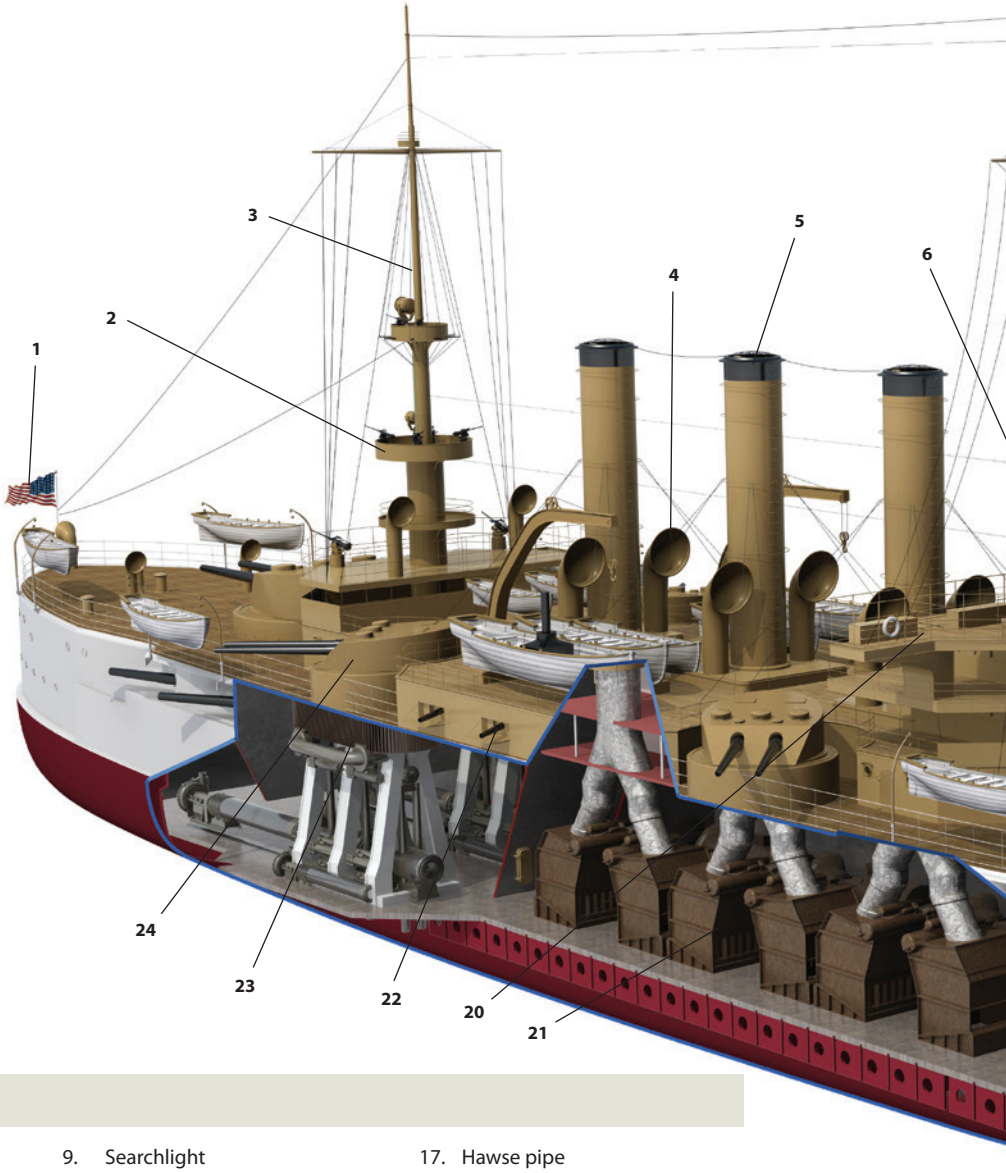
Connecticut class (1906–08)

After the Virginias' embarrassing design issues, Congress refused to fund battleships in 1901, instead ordering the USN to submit detailed, technically justified battleship plans by that December. The USN's response was an improved *Virginia*. Four 12in/45 guns provided the 1901 scheme's main battery, but the intermediate battery again proved contentious, thanks to the newly available 7in/45 rapid-firing gun. The technical Bureau chiefs derided the 8in battery as ineffective and wanted it dropped for good. The Board on Construction, after polling more than 80 officers, discarded superposed turrets and unanimously settled on a mixed intermediate battery of eight

D

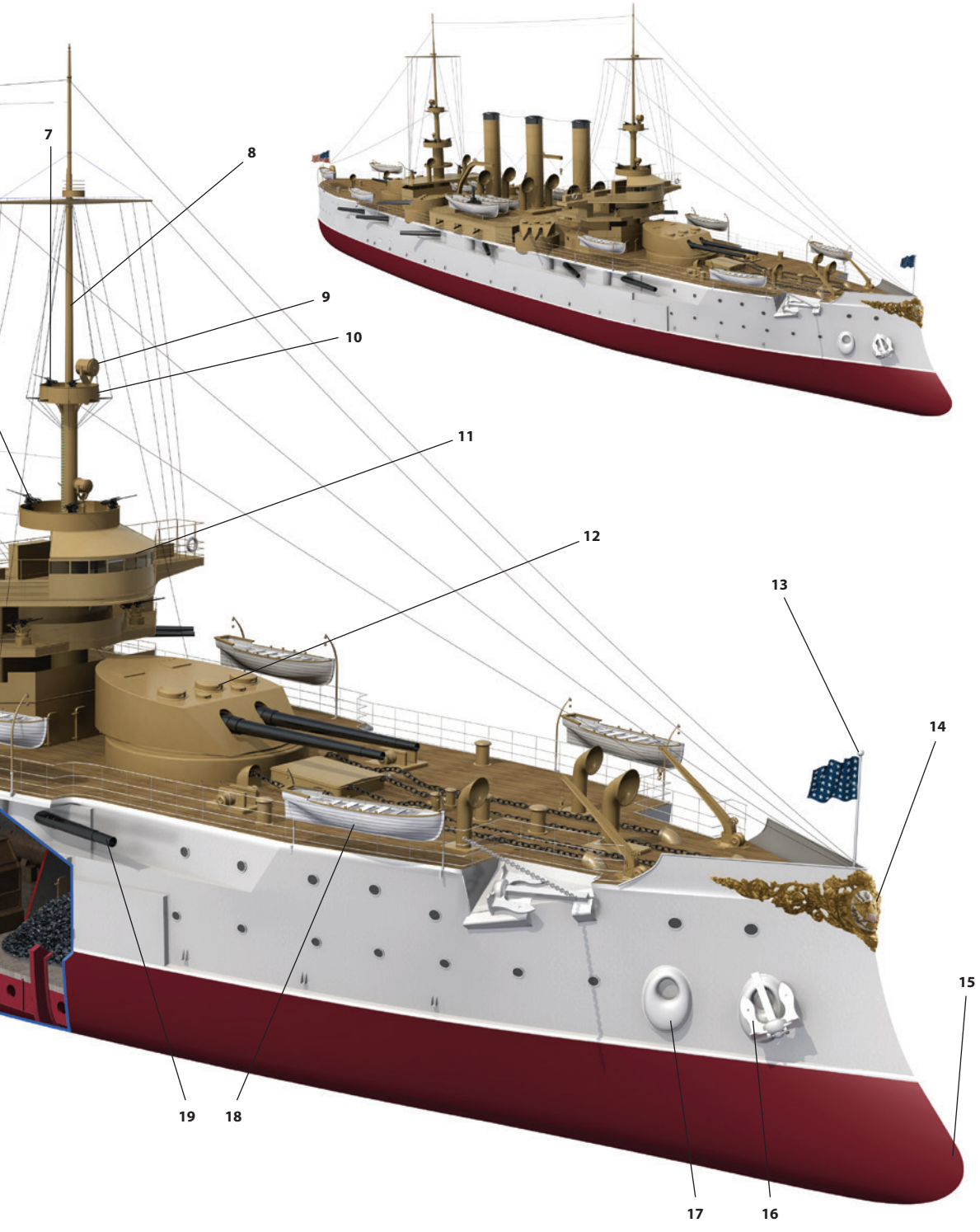
USS *KANSAS* (BB-21)

Connecticut-class battleship USS *Kansas* (BB-21) in April 1908, while visiting California as part of the Great White Fleet. *Kansas* was launched on August 12, 1905 at Camden, New Jersey and christened by 22-year-old Anna Hoch, daughter of Kansas governor, Edward Hoch. Although *Kansas* had been a dry state since 1881, the USN insisted *Kansas* be christened with champagne, rather than Kansas crude oil or water from John Brown's Osawatomie well. Commissioned in Philadelphia on April 18, 1907 under Captain Charles E. Vreeland, *Kansas* joined the Atlantic Fleet at Hampton Roads on December 9, 1907. She was the newest battleship of the Great White Fleet.



KEY

1. Ensign
2. Lower fighting top
3. Mainmast
4. Cowl ventilator
5. Funnel
6. 3-pounder (47mm) gun
7. 1-pounder (37mm) gun
8. Foremast
9. Searchlight
10. Upper fighting top
11. Navigation bridge
12. 12in/45 turret
13. Jack
14. Bow ornament
15. Ram bow
16. Anchor
17. Hawse pipe
18. Launch
19. 7in/45 gun
20. Flying bridge
21. Boiler
22. 3in/50 gun
23. Vertical triple expansion engine
24. 8in/45 turret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Battleship *Connecticut* (BB-18) running sea trials off the coast of Maine, 1907. Cameraman Enrique Muller's boat was nearly swamped seconds later, but the resulting image proved iconic. Like all American pre-dreadnought battleships, *Connecticut's* ram bow tended to scoop up water at high speed, visible here. (Author's Collection)

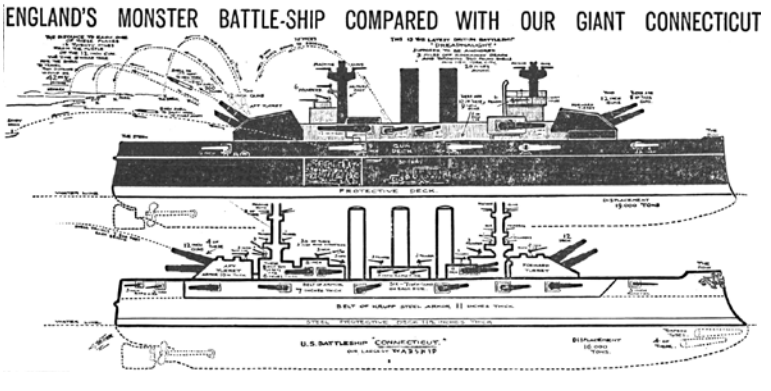
8in/45 guns in quadrilateral turrets and 12 casemated 7in/45 guns, while 20 3in/50 guns provided anti-torpedo defense. Torpedo tubes would not be added until 1909 refits. The Connecticuts' armor scheme resembled the Virginias'; an 11in Krupp belt shielded the waterline, with 4in bow and stern extensions.

Thus reassured, on July 1, 1902, Congress authorized "two first-class battleships carrying the heaviest armor and most powerful armament for vessels of their class upon a trial displacement of not more than 16,000 tons." On March 10, 1903, lead ship *Connecticut* (BB-18) was laid down at the New York Navy Yard, the first US battleship built in a government yard since *Texas* in 1889. *Louisiana* (BB-19) was laid down at the civilian Newport News Shipbuilding on March 21, 1904.

Meanwhile, parallel naval and congressional debates over battleships' rapidly escalating size and cost came to an inevitable head. The venerable George Dewey and Alfred Thayer Mahan testified in favor of larger numbers of smaller battleships which, as technological dilettantes, they erroneously believed equivalent to the sailing era's standard capital ship, the 74-gun third-rate ship-of-the-line. The House nevertheless approved the USN's 1903 request for three more 16,000-ton Connecticut-class battleships and a 14,500-ton Tennessee-class armored cruiser. The Senate then countered with four 12,000-ton "*Oregon*-type" battleships and two 9,500-ton "*Brooklyn*-type" armored cruisers. The final March 3, 1903 compromise legislation deleted the armored cruisers, consented to three 16,000-ton Connecticuts, and ordered two additional 13,000-ton battleships, which became the Mississippi class. The three new Connecticut-class battleships, *Vermont* (BB-20), *Kansas* (BB-21), and *Minnesota* (BB-22) were laid down at commercial yards between October 1903 and May 1904. Congress authorized a single battleship in 1904, a sixth Connecticut. When commissioned on March 19, 1908, *New Hampshire* (BB-25) became the United States' final pre-dreadnought.

At 16,000 tons and 450ft long, the flush-decked Connecticuts were the largest US pre-dreadnoughts and the first truly ocean-going US battleships; their greater size and lower center-of-gravity made them superior seakeepers to the Virginias. Model basin tests produced the most efficient hull form yet. Twelve Babcock & Wilcox boilers provided steam to two four-cylinder VTEs, producing 18.8 knots at 16,500hp. A 2,593-ton coal capacity provided a 7,579nm radius at 10 knots.

Britain's *Dreadnought* (top) and the United States' *Connecticut* (bottom) received a detailed comparison profile in the February 22, 1906 edition of the *New York Evening World*. The American paper acknowledged the just-launched *Dreadnought* as "the largest battle-ship afloat, and in actual fighting force, the most powerful" but countered with vague claims of *Connecticut's* "superior efficiency, larger zone of action, superiority of ordnance, and greater armor." (Author's Collection)



In size, numbers, and quality, the Connecticuts proved the epitome of the USN's pre-dreadnought fleet. Ironically, well before any Connecticuts were completed, they were outclassed by HMS *Dreadnought*. Nevertheless, the Connecticuts proved the pinnacle of US pre-dreadnought design and were likely the finest mixed-battery battleships ever built.

Connecticut-class specifications	
Length:	450ft
Beam:	76ft 10in
Draft:	24ft 6in
Displacement:	16,000 tons
Propulsion:	Two VTE engines, 12 Babcock & Wilcox boilers
Speed:	18.8 knots at 16,500ihp
Range:	Radius 7,579nm at 10 knots (New Hampshire)
Coal capacity:	2,593 tons (New Hampshire)
Armament:	Four 12in/45 BL rifles in two double turrets (240 rounds)
	Eight 8in/45 BL rifles (800 rounds)
	12 7in/45 RF guns (1,200 rounds)
	20 3in/50 RF guns
	12 3-pdrs, four 1-pdrs, six .30-caliber M1895 machine guns
	Four submerged 21in Whitehead torpedo tubes
Protection:	Belt: 11in
	Sides: 6in
	Deck: 3in
	Conning tower: 9in
	Main turrets 12in, barbettes 10in
Complement:	41 officers, 855 enlisted
Cost:	$7.9 million

Connecticut-class construction							
Ship		**Built at**	**Yard**	**Laid down**	**Launched**	**Commissioned**	**Fate**
BB-18	***Connecticut***	New York, NY	New York Navy Yard	Mar 10 1903	Sep 29 1904	Sep 29 1906	Sold Nov 1 1923
BB-19	***Louisiana***	Newport News, VA	Newport News Shipbuilding	Mar 21 1904	Aug 27 1904	Jun 2 1906	Sold Nov 1 1923
BB-20	***Vermont***	Quincy, MA	Fore River Shipyard	May 21 1904	Aug 31 1905	Mar 4 1907	Sold Nov 30 1923
BB-21	***Kansas***	Camden, NJ	New York Shipbuilding	Feb 10 1904	Aug 12 1905	Apr 18 1907	Sold Jan 23 1924
BB-22	***Minnesota***	Newport News, VA	Newport News Shipbuilding	Oct 27 1903	Apr 8 1905	Mar 9 1907	Sold Jan 23 1924
BB-25	***New Hampshire***	Camden, NJ	New York Shipbuilding	May 1 1905	Jun 30 1906	Mar 19 1908	Sold Nov 1 1923

Mississippi class (1908)

Saddled with an unwanted, politically driven bantam class, the Board on Construction evaluated four alternative plans to pare 3,000 tons from the fourth and fifth 1903-authorized battleships. The first scheme was a scaled-up *Maine* mounting four 12in/45 guns and 14 7in/45s. The second was a 17-knot, flush-decked, all-big gun battleship mounting 12 10in/40 guns in two centerline and four wing turrets. A third option was a 22-knot battleship wielding four 10in/40 guns and 16 6in/50 guns. The fourth design, a scaled-down *Connecticut*, was selected on June 10, 1903.

The Mississippis retained *Connecticut*'s four 12in/45 and eight 8in/45 guns, but lesser batteries were cut to eight 7in/45 and 12 3in/50 guns. Two 21in underwater torpedo tubes were installed. The Mississippis' Krupp armor scheme was virtually identical to the Connecticuts'.

The Board mostly sacrificed performance. Eight boilers supplied steam to two three-cylinder VTEs producing 13,607ihp. The Mississippis retained the Connecticuts' beam but the hull was truncated 75ft. The reduced

Mississippi (BB-23) fitting out at Philadelphia's Cramp shipyard, 1907. Her turrets are incomplete and her hull seams have been coated in primer. Though difficult to see, *Mississippi's* name is already displayed across her stern. *Mississippi* was the sixth American steel battleship built at the Cramp yards; her sister *Idaho* was the seventh. (US Navy)

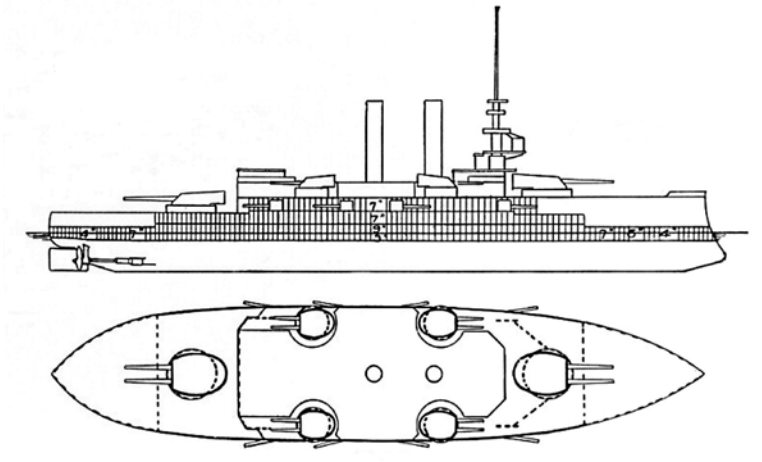
power on *Mississippi*'s broader form cut top speed to 17 knots, lowered fuel efficiency, and reduced economic cruising speed to just 8.5 knots instead of the fleet's standard ten. Combined with a 25 percent bunkerage reduction, *Mississippi*'s range fell to 5,750nm at 10 knots. These were concerning flaws in a USN obsessed with tactical homogeneity.

The Mississippis' many hull-design compromises produced inferior and erratic seakeeping. The short, broad hull caused excessive pitching. A stepped deck lowered Turret II to improve stability, but the deeply cut-away stern made course-keeping difficult. The combined motions produced an abnormal yawing tendency, making the Mississippis excessively poor gunnery platforms.

The Board on Construction washed its hands of the Mississippis, noting it did "not intend to convey that the design of the 13,000-ton battleships represents its opinion of what first-class battleships should be, nor what the United States Navy should have." Congress's leading big battleship opponent, Republican Senator Eugene Hale, explained Congressional logic behind the Mississippis:

> [*Mississippi*] does not fit the fancy of a naval officer. But she has the same number of 12-inch guns and the same number of turrets and the same efficient force, so far as the great guns go. She is smaller, more efficiently handled, and when she goes to the bottom, as any battleship will from the effect of a torpedo …. instead of seven or eight million dollars going to the bottom, it is only five million.

Mississippi (BB-23) and *Idaho* (BB-24) were laid down at Philadelphia's William Cramp & Sons on May 12, 1904. *Mississippi* was commissioned on February 1, 1908 and *Idaho* on April 1, 1908. The class was so disappointing that *Mississippi* was put into reserve in August 1912, followed by *Idaho* on October 27, 1913. *Mississippi* was briefly reactivated to carry seaplanes, but on July 8, 1914 *Mississippi* and *Idaho* were sold to Greece for a total of $12.5 million and transferred on July 21. BB-24's and BB-25's names were immediately carried on by the New Mexico-class superdreadnoughts *Mississippi* (BB-41) and *Idaho* (BB-42), the latter directly funded by the pre-dreadnoughts' sale.



Mississippi-class specifications	
Length:	375ft
Beam:	77ft
Draft:	24ft 8in
Displacement:	13,000 tons
Propulsion:	Two three-cylinder VTE engines, eight Babcock & Wilcox boilers
Speed:	17.1 knots at 13,607ihp
Range:	5,750nm at 10 knots
Coal capacity:	1,795 tons
Armament:	Four 12in/45 BL rifles in two double turrets (284 rounds)
	Eight 8in/45 BL rifles (888 rounds)
	Eight 7in/45 RF guns (888 rounds)
	12 3in/50 RF guns
	12 3-pdrs, six 3-pdrs, two 1-pdrs, six .30-caliber M1895 machine guns
	Two submerged 21in Whitehead torpedo tubes
Protection:	Belt: 9in
	Sides: 7in
	Deck: 3in
	Conning tower: 9in
	Main turrets 12in, barbettes 10in
Complement:	34 officers, 673 enlisted
Cost:	$5.9 million

Mississippi-class construction							
Ship		**Built at**		**Laid down**	**Launched**	**Commissioned**	**Fate**
BB-23	***Mississippi***	Philadelphia, PA	William Cramp & Sons	May 12 1904	Sep 30 1905	Feb 1 1908	Sunk by Luftwaffe Apr 23 1941
BB-24	***Idaho***	Philadelphia, PA	William Cramp & Sons	May 12 1904	Dec 9 1905	Apr 1 1908	Sunk by Luftwaffe Apr 23 1941

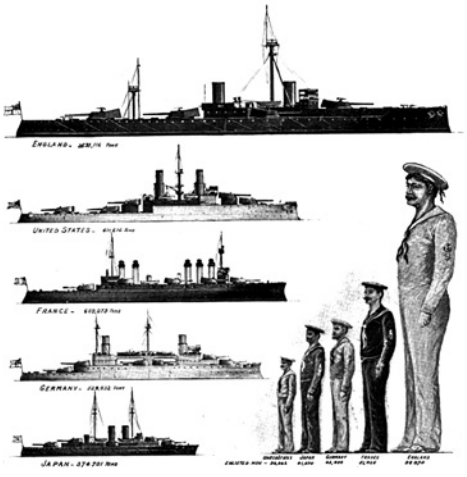
THE BATTLE FLEET

Personnel

In 1897, then-Assistant Secretary of the Navy Teddy Roosevelt observed, "Every officer on a modern war vessel has to be an engineer whether he wants to or not." In 1899, Congress legally amalgamated line officers and engineers into "one homogeneous body" as Roosevelt and the engineers had desired, but "every officer a fighting engineer" took some time, a Bureau chief noting, "A man does not become at once a skilled engineer by assuming charge of machinery." By 1902, only 1,033 USN officers were in commission, against 1,600 authorized. An emergency near-tripling of Naval Academy appointees produced sufficient junior officers by the 1907–09 Great White Fleet cruise.

USN enlisted roles were becoming increasingly technical-based, as electrician, radioman, and yeoman ratings, among others, were established beginning in 1898. Promising gunners and torpedomen already trained ashore at Washington, DC and Newport, Rhode Island. The enlisted ranks grew steadily in size, quality, and education. In 1886 only 46 percent of the USN's 7,900 enlisted strength had been native-born; many were criminals and runaways. By 1905 total enlisted strength was 30,804 men, with 80.8 percent native-born and 91.8 percent US citizens. By 1909, some 90 percent were native-born, with 96 percent citizens.

OPPOSITE
The Mississippi-class generally copied the Connecticuts' armor scheme; of the Connecticuts' basic tactical attributes, protection was the least negatively affected by the design downsize. Further weight reduction was achieved by deleting the Connecticuts' mainmast and third funnel. However, an early decision to delete torpedo tubes was reversed. (NHHC NH 76662)



A 1907 *Scientific American* diagram compares personnel and total displacement of the five great Edwardian-era naval powers – Britain, the United States, France, Germany, and Japan. At 611,616 tons the United States was a distant second to Britain in displacement (37.5 percent of the Royal Navy's 1.6 million tons), while at 34,062 enlisted men the USN was dead last in total personnel, equaling just 34.4 percent of the Royal Navy's 98,973 noncommissioned strength. (Author's collection)

Of 91,588 who attempted to enlist in 1909, only 18,713 were accepted (20.4 percent). The USN enlisted force was now truly what Roosevelt dubbed "sea mechanics" of the "highest type of sailormen."

An archaic, non-meritocratic promotion system meant that in 1905 the average US battleship captain was 58 years old; new rear admirals were promoted at the average age of 60, about 14 months from forced retirement. Excepting Dewey's lifetime promotion, until 1915 Congress authorized no rank higher than rear admiral, which proved predictably awkward on foreign stations. The Navy Secretary's 1905 *Annual Report* claimed rear admiral was "a rank entirely inadequate to the responsibilities or dignities of command" of the diplomatically charged Asiatic and North Atlantic fleets; as rear admiral the US Asiatic commander was outranked by his British, German, French, Japanese, and Russian counterparts, despite the US force being among the strongest.

Naval bases

Battleships required regular drydocking for maintenance and hull-cleaning, ideally every six months. During 1903, for example, North Atlantic Fleet battleships averaged 25 percent of their time in navy yards undergoing repairs. Until 1898, virtually all sovereign US bases lay within the contiguous United States, where repairs, maintenance, coaling, and provisioning were performed.

Mahan claimed, "Control of a maritime region is insured primarily by a navy, secondarily, by positions, suitably chosen and spaced one from the other, upon which as bases the Navy rests, and from which it can exert its strength," comparing a fleet without overseas bases to "landbirds, unable to fly beyond the shore." For exactly these reasons, the 1898 Spanish-American War prompted a torrent of US overseas acquisitions. On July 4, 1898 Congress annexed the independent Republic of Hawaii. Then on December 10, 1898, the victorious United States paid Spain $20 million for Puerto Rico, Guam, and the Philippines as postwar settlement. Empty Wake Island, halfway between Honolulu and Manila, was occupied on January 17, 1899. After a three-way 1899 partition, on February 19, 1900, the United States annexed eastern Samoa for Tutuila's Pago Pago harbor. By February 23, 1903, the USN would secure a perpetual lease of Cuba's Guantánamo Bay. Some figures illustrate the exponentially growing size of the USN and its strategic commitments during this period. In 1897, the USN had purchased 138,319 tons of coal, a new peacetime record. That record was then shattered four of the next five years, soaring to 487,036 tons by 1903. Finally, on May 4, 1904, the United States paid Panama $10 million and took possession of the Panama Canal Zone. In just six years, the USN's transoceanic network of sovereign bases was largely complete.

The 1900 Boxer Rebellion had exposed the USN's lack of a major Far East base – unique among the great powers. A dedicated China base was first suggested in August 1900. Congress, however, considered a permanent, exclusively American China base expensive and inconsistent with the

United States' "Open Door" policy. The USN refocused towards the Philippines' Olangapo at deep-water Subic Bay, reporting in 1905, "We are now entirely dependent upon the courtesy of foreign nations for docking facilities and for all important repairs to hull or engine." In June 1905, the USN commissioned the 18,000-ton floating drydock USS *Dewey* (YFD-1). Capable of lifting a 16,000-ton battleship, *Dewey* was successfully towed to the Philippines between December 1905 and July 1906. However, by 1907 the US Army insisted Subic Bay required 125,000 troops to defend it from a Port Arthur-style overland attack. In 1908, Roosevelt axed the Olangapo plan and ordered Hawaii's Pearl Harbor be developed into the USN's advanced Pacific base. By 1909, the USN would boast eight Navy Yards and 17 Naval Stations and smaller bases (nine outside the mainland United States). Meanwhile, the Panama Canal would open on August 3, 1914, having cost $375 million and 5,609 lives to construct. If a Far East crisis erupted, Guantánamo, Panama, San Francisco, Hawaii, Guam, and Manila would provide the Atlantic-based US battle fleet its sovereign American stepping stones en route to the Orient.

Battleship USS *Ohio* (BB-12) in Dry Dock #2 at Mare Island Navy Yard, California, August 10, 1915. Mare Island had been established in 1854 and was the first US Navy base on the Pacific. Across the bay, San Francisco's Hunter's Point commercial shipyard had serviced the Great White Fleet in 1908. Hunter's Point would not be acquired by the US Navy until 1940. (US Navy)

USN coal stocks worldwide, July 1, 1909	
NY = Naval Yard	
NS = Naval Station	
Location	**Coal (tons)**
East Lamoine, ME	12,000
NY Boston	15,000
Bradford, RI	45,000
New London, CT	8,300
NY New York	9,000
NY Philadelphia	15,000
NY Norfolk	NONE, commercial
NY Charleston	2,500
NS Key West	15,000
NY Pensacola	NONE
NS New Orleans	5,000
NS Guantánamo	17,000
NS San Juan, PR	18,000
NS Culebra, PR	5,000
Pichilinque Bay, Mexico	10,000
San Diego, CA	20,000 (planned)
California City Point, CA	20,000 (90,000 planned)
NY Mare Island	30,000
NY Puget Sound	24,000 covered + 50,000 open
Sitka, AK	8,000
NS Hawaii (Honolulu)	30,000
Pearl Harbor, HI	(planned)
NS Tutuila, Samoa	5,000
NS Guam	3,000
NS Cavite, Philippines	22,000 covered + 80,000 open
NS Olangapo, Philippines	15,000
Yokohama, Japan	7,000

OPPOSITE
A stern view of the battleship *Maine* (BB-10) in drydock at the Brooklyn Navy Yard, 1903. The Brooklyn Navy Yard (also known as the New York Navy Yard) was established in 1801. It was one of the East Coast's primary naval shipyards for the construction and repair of battleships and later aircraft carriers until finally being decommissioned in 1966. (US Navy)

Led by USS *Connecticut* (BB-18), the US First Battleship Division steams out of New York harbor, October 3, 1911. *Connecticut* flies the flag of Atlantic Fleet commander Rear Admiral Hugo Osterhaus. Up to a million spectators lined the Hudson to watch the battleships pass in review. (US Navy)

Squadrons and fleets 1899–1907

Asiatic

Indiana-class battleship *Oregon* reached Manila on March 18, 1899, beginning the USN's seven-year battleship presence in Asia. After *Kentucky*'s arrival on February 5, 1901, *Oregon* departed for a West Coast overhaul. In August 1901, the Asiatic station was divided into a Northern Squadron (China, Japan, and Korea), and a Southern Squadron (Philippines). The Northern Squadron's mission was defined as "River and harbor service for the protection of our interests in China, and [secondarily] a cruising squadron to constitute our effective mobile naval force in the Far East." By June 1902, the Northern Squadron comprised battleship *Kentucky* (flagship), monitors *Monterey* and *Monadnock*, protected cruiser *New Orleans*, and four third-rate gunboats. Southern Squadron comprised 20 gunboats. Armored cruiser *New York* was the independent Asiatic station flagship. Hong Kong was the preferred Southern Squadron repair yard, with Nagasaki for the Northern Squadron. A coaling station and hospital were established at Yokohama.

Plans to increase the Asiatic station to six battleships were never realized. On June 12, 1903, *Wisconsin* arrived at Yokohama and became Northern Squadron flagship. *Kentucky* departed the Asiatic for New York on March 13, 1904. *Ohio* arrived at Manila in spring 1905. By 1905, the Asiatic Fleet was organized into the Battleship Squadron (battleships *Wisconsin*, *Oregon*, and *Ohio*, monitors *Monterey* and *Monadnock*, a gunboat division, and a five-destroyer torpedo flotilla), the Cruiser Squadron (four cruisers), the Philippine Squadron (gunboats), and various auxiliaries. By September 1906, *Oregon*, *Wisconsin*, and *Ohio* were recalled to the United States.

Pacific

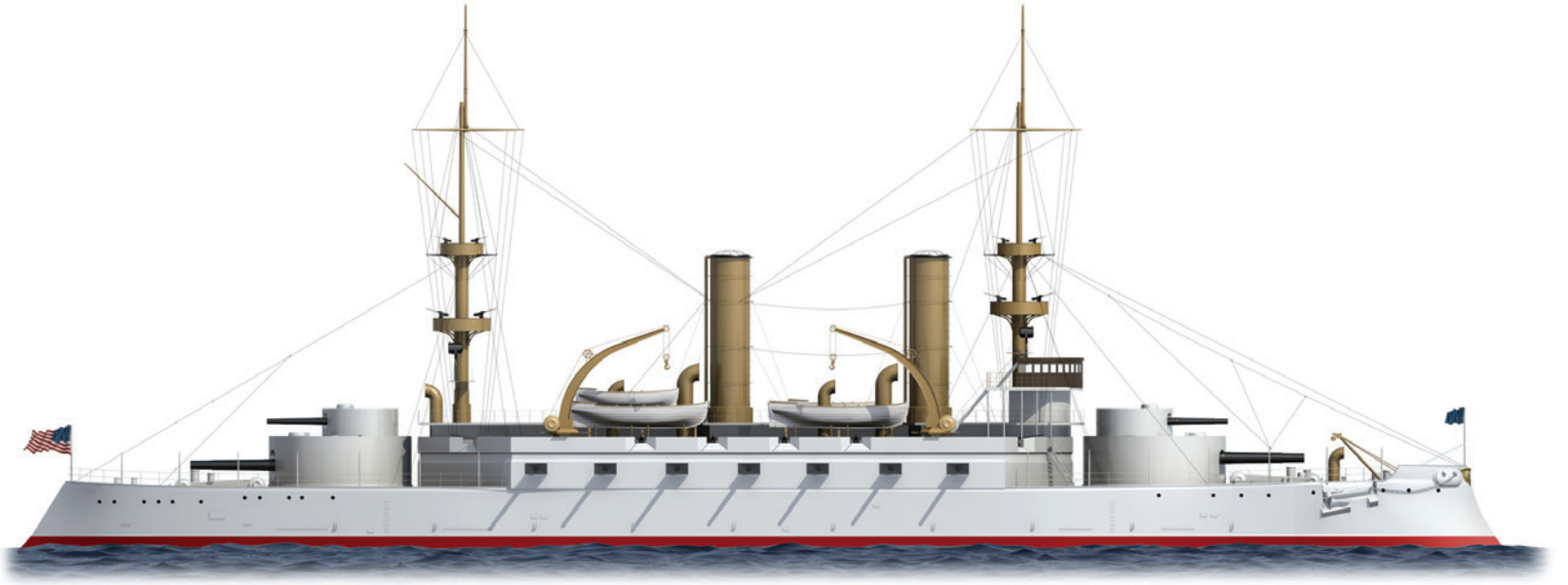
In December 1898, battleship *Iowa* had transferred to the West Coast-based Pacific Squadron. By April 16, 1901, the Pacific Squadron consisted of battleships *Iowa* and *Wisconsin* (flagship), cruiser *Philadelphia*, and torpedo boat *Farragut*. *Iowa* departed in December 1901 and *Wisconsin* followed in May 1903, leaving the Pacific Squadron without battleships. By 1905, the Pacific Squadron comprised three cruisers, monitor *Wyoming*, two gunboats, and three destroyers. On April 15, 1907, the Asiatic Fleet and Pacific Squadron were combined into the Pacific Fleet and organized into the West Coast-based First Squadron (armored cruisers of the former Asiatic Fleet), the West Coast-based Second Squadron (former Pacific Squadron), and (remaining in the Far East) the Third Squadron (gunboats) and First

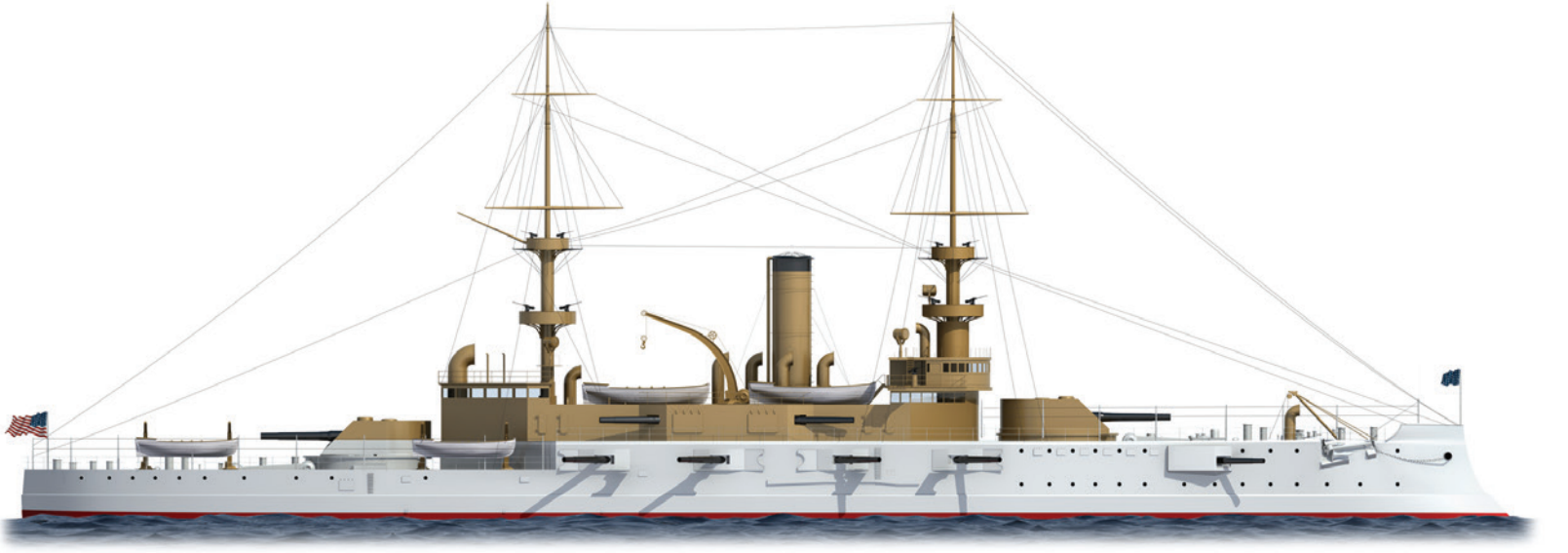
E

THE ASIATIC

Kearsarge-class battleship USS *Kentucky* (BB-6) is seen in February 1901, when she arrived at Manila for service on the Asiatic station. *Kentucky* was the Asiatic flagship between March 23, 1901 and April 12, 1902, and again from November 1902 to March 1904. USN livery regulations in this period were not precise; *Kentucky* and sister ship *Kearsarge* were commissioned nearly all-white, with just masts, funnels, and top hamper painted ocher. This scheme does not seem to have been repeated with any other battleships.

Illinois-class battleship USS *Wisconsin* (BB-9) is seen below in June 1903, after arrival at Yokohama, Japan for service as Northern Squadron flagship of the Asiatic Fleet. *Wisconsin* is painted in a more standard format of white hull and ocher superstructure.





Battleship USS *Kearsarge* (BB-5), flagship of the European Squadron, lights ship while visiting Portsmouth, UK, in July 1903. HMS *Victory* is off *Kearsarge's* port bow. Turn-of-the-century battleships were at least as much diplomatic tools as they were weapons of war; with their electric-powered running lights, signage, and searchlights, they were capable of putting on quite a public relations show for both American and foreign hosts. (US Navy)

Torpedo Flotilla (five destroyers). Battleships *Wisconsin* and *Oregon* had both returned to Puget Sound in 1906 for decommissioning; *Wisconsin* was overhauled and recommissioned in April 1908. The Seattle-built battleship *Nebraska* was commissioned on the West Coast in July 1907. She and *Wisconsin* would join the Great White Fleet in July 1908, leaving the intermittently commissioned *Oregon* as the only US battleship on the West Coast until 1919.

Europe

The European Squadron was established in late 1901 and by May 1902 comprised battleship *Illinois* and three cruisers. *Illinois* visited Spithead, England in July 1902 to take part in the naval review celebrating King Edward VII's coronation. *Illinois* returned to the United States in January 1903, leaving the European Squadron at four cruisers. Battleship *Kearsarge* temporarily joined the European Squadron as flagship in June 1903 and called at Southampton (England) and Nyborg (Denmark) in mid-June. Kaiser Wilhelm II and Admiral Alfred von Tirpitz inspected *Kearsarge* at Kiel, Germany, on June 25. The Kaiser, a fellow naval buff, cabled Roosevelt profuse thanks for *Kearsarge*'s port call. Returning to Spithead, *Kearsarge* was toured by the future King George V on July 13, 1903. The European Squadron was dissolved in 1905.

South Atlantic

Established in 1901, the South Atlantic Squadron comprised three cruisers and one gunboat and typically operated from Rio de Janeiro and Montevideo. On February 12, 1902, battleship *Iowa* replaced cruiser *Chicago*, but *Iowa*'s draft was too deep to easily cruise the River Plate. Replaced by cruiser *Newark*, in January 1903, *Iow*a transferred to the North Atlantic Fleet. By April 1904, the squadron comprised two cruisers and four gunboats; the command was abolished the following year.

Atlantic

In 1903, the newly established North Atlantic Fleet comprised the Battleship, Caribbean, and Coast Squadrons, plus the destroyer flotilla and auxiliaries. The Battleship Squadron comprised four battleships, and the squadron's rear admiral also commanded the North Atlantic Fleet. By January 1903, *Iowa* and *Illinois* were transferred from the South Atlantic and European stations, eventually joining the Battleship Squadron. Based in Culebra, Puerto Rico, the Caribbean division had been established on October 4, 1902 to provide a fast-reaction force to Caribbean crises and to serve as the combined fleet's cruiser force in wartime. On December 29, 1902, it was reorganized into the North Atlantic Fleet's Caribbean Squadron. The Key West-based Coast Squadron was established on May 19, 1903 primarily for coastal defense but also to augment the fleet in the West Indies. It comprised battleships *Texas* (flagship) and *Indiana*, monitors *Arkansas*, *Nevada*, and *Florida*, and five destroyers.

On December 10, 1903, *Kearsarge*, *Alabama*, *Illinois*, and *Massachusetts* participated in the formal handover of Guantánamo to the United States. In June 1904, the battleships were dispatched to Europe in response to the Perdicaris crisis brewing in Morocco. Portugal's King Carlos I inspected the battleships at Lisbon on June 11, followed by Greece's King George I at Phaleron Bay, Greece on July 4. After calling at Corfu (Greece), Trieste

(Italy), and Fiume (Croatia), the squadron returned to Newport, Rhode Island on August 29, 1904.

In March 1905, the North Atlantic Fleet was reorganized into the First Squadron (battleships), Second Squadron (cruisers), Third Squadron (cruisers and gunboats), and Coast Squadron (coast defense battleships and monitors). Simultaneously the European and South Atlantic Squadrons were combined with the North Atlantic Fleet, which was renamed the Atlantic Fleet on January 1, 1906. By mid-1906, the Coast Squadron had been abolished and the Atlantic Fleet comprised eight battleships, four armored cruisers, four protected cruisers, and six gunboats. By April 1907, every commissioned US battleship was concentrated at Hampton Roads, Virginia. The Atlantic Fleet now boasted 16 battleships, eight cruisers, eight gunboats, and 11 destroyers. The USN's 1907 *Annual Report* claimed, "These sixteen ships formed, in weight and numbers combined, the most powerful fleet of battleships under one command in any navy."

The Atlantic Fleet steams majestically through Chesapeake Bay after departing Annapolis, Maryland, c.1913. The photograph was probably taken from battleship USS *Rhode Island*. Immediately in front of the camera are Virginia-class sister ships USS *New Jersey* and USS *Georgia*. Leading the column are at least six dreadnoughts. (US Navy NH 101064)

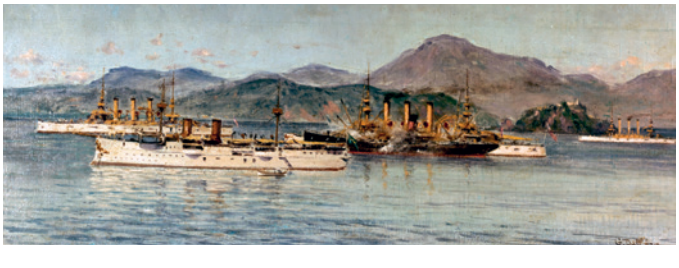
THE GREAT WHITE FLEET 1907–09

On April 26, 1907, the battleships helped open the Hampton Roads-based Jamestown Exposition, where they proved a major attraction. Meanwhile, President Roosevelt decided to send the Atlantic Fleet on a practice cruise to the Pacific, confiding, "I became convinced it was absolutely necessary for us to try in time of peace … and not make the experiment in time of war." Roosevelt was adamant there would be no American Tsushima and he wanted the world to know it. More generally, Roosevelt intended the cruise as a political, naval, and technical showpiece of growing US power – a source of pride to Americans, a gesture of goodwill to foreign nations, and a thinly veiled warning to potential enemies. However, the expedition was not adolescent saber-rattling as revisionist historians commonly assert. The fleet was never a serious war threat or intended as such; foreign naval officers understood that Roosevelt's battleships could never mount a serious campaign without sufficient escorts and auxiliaries.

Overall command fell to venerable, combat-hardened, but ailing 61-year-old Rear Admiral Robley "Fighting Bob" Evans. Painted in the standard American livery of white hulls and yellow ocher superstructures, the press quickly dubbed the Atlantic Fleet "The Great White Fleet." Evans reported his ships "were ready at the drop of a hat for a feast, a frolic, or a fight." At 1125hrs, December 16, 1907, the 16 gleaming white battleships, four rear admirals, and 14,000 sailors and marines steamed past Roosevelt and presidential yacht *Mayflower* and thence into the Atlantic. The battleships were preceded by seven destroyers and accompanied by five auxiliaries.

The Great White Fleet, in a three-mile long column, steams out of Hampton Roads, Virginia, on December 16, 1907. *Kansas* (BB-21) is at the far left, followed by her sister *Vermont* (BB-20). Earlier, while touring several battleships, an excited President Roosevelt had gaped in amazement, "Did you ever see such a fleet? Isn't it magnificent?" (US Navy)

US ATLANTIC FLEET (GREAT WHITE FLEET) – REAR ADMIRAL ROBLEY D. EVANS
First Squadron
First Division (Evans)
BB-18 *Connecticut* (F)
BB-21 *Kansas*
BB-20 *Vermont*
BB-19 *Louisiana*
Second Division (Rear Admiral William H. Emory)
BB-15 *Georgia* (F)
BB-16 *New Jersey*
BB-17 *Rhode Island*
BB-13 *Virginia*
Second Squadron
Third Division (Rear Admiral Charles M. Thomas)
BB-22 *Minnesota* (F)
BB-10 *Maine*
BB-11 *Missouri*
BB-12 *Ohio*
Fourth Division (Rear Admiral Charles S. Sperry)
BB-8 *Alabama* (F)
BB-7 *Illinois*
BB-5 *Kearsarge*
BB-6 *Kentucky*
Fleet Auxiliaries
AF-3 *Culgoa*
AD-6 *Panther*
AH *Relief*
AF-4 *Glacier*
PY *Yankton*
Torpedo Flotilla
DD-6 *Hopkins*
DD-7 *Hull*
DD-8 *Lawrence*
DD-13 *Stewart*
DD-14 *Truxton*
DD-15 *Whipple*
AO-7 *Arethusa*

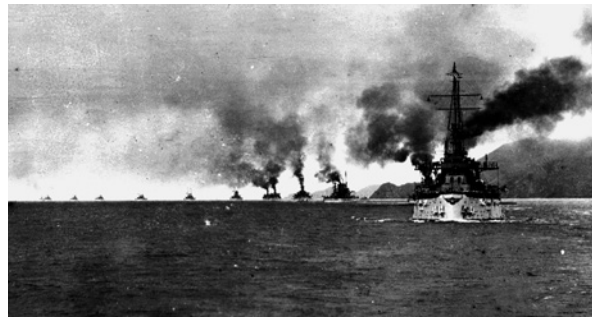


The Great White Fleet anchored at Rio de Janeiro's Guanabara Bay in this 1908 painting by G. Dall'aros. A collier is docked alongside one of the battleships, while the two-funneled Brazilian cruiser *Almirante Tamarand* is visible in the foreground. Brazilian authorities judged a colossal bar fight with Brazilian longshoremen not the US sailors' fault, and by the time the fleet departed Rio on January 22, Brazilian president Afonso Pena was praising the "glorious American navy." (US Navy)

Hours after departure, Evans informed his men via wireless that they would be returning to the Atlantic via the Pacific and the Suez Canal – that is, around the world. Only Roosevelt and top naval officers had known. But Robley's transmission was intercepted, and Congress responded with threats to withhold appropriations. Roosevelt bluntly stated he already had the money and dared Congress to "try and get it back." East Coast politicians' anxieties would be further strained the following summer when Imperial Germany's Hochseeflotte unexpectedly cruised 16 battleships into the Atlantic.

The fleet called first at Port-of-Spain, Trinidad, on December 23–29, 1907 before crossing the equator on

January 6, 1908. Robley's fleet then reached Rio de Janeiro on January 12 and departed ten days later after an eventful and enthusiastic visit. Buenos Aires was too shallow for the US battleships, so the six US destroyers visited the port on January 26. That same evening, Argentine cruisers *San Martin*, *Buenos Ayres*, *Pueyrredon*, and *9 de Julio* escorted the US battleships overnight until departing the next morning. Entering the Strait of Magellan, the battleships arrived at Puntas Arenas, Chile on February 1, 1908.



Battleship *New Jersey* (BB-16) steams through the Golden Gate and into San Francisco Bay, May 6, 1908. Nine more Great White Fleet battleships trail behind her. Over a million spectators crowded the bay to watch the spectacle. San Francisco was still physically and psychologically recovering from the 1906 earthquake and the US Fleet's visit was heavily celebrated. (NHHC NH 106095)

Escorted by the Chilean cruiser *Chacabuco*, the fleet departed Puntas Arenas late on February 7. Steaming single-file through the western Strait of Magellan on February 8, the fleet entered the Pacific that evening. On February 14, the battleships conducted a steam-by of Valparaiso, Chile where 250,000 had gathered to watch, then docked at Callao, Peru between February 20 and 29, where US sailors toured the Andes.

Between March 12 and April 11, 1908, the fleet conducted gunnery practice at Magdalena Bay, Mexico. By now Rear Admiral Robley had become virtually bedridden with gout. On March 30, *Connecticut* dispatched Robley to Paso Robles, California for hospitalization. Rear Admiral Charles Thomas assumed overall command.

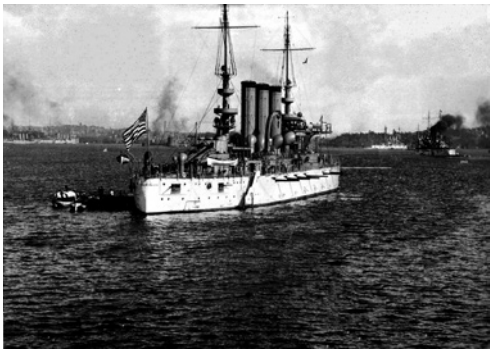
On April 14, the battleships anchored off San Diego's Hotel Coronado and the city gave them a tumultuous welcome. After days of parties, tours, and balls, the fleet departed on April 18 for the ten-hour steam to Los Angeles, where similar festivities awaited. Some 30,000 California oranges found their way aboard. The battleship divisions then broke up and visited San Pedro, Long Beach, Santa Monica, and Redondo Beach. On April 25, the fleet visited Santa Barbara, then made for Santa Cruz and Monterey, where Robley was piped back aboard *Connecticut* on May 2.

On May 5, the battleships anchored off San Francisco overnight. Over one million spectators turned out to watch the Atlantic Fleet steam through the Golden Gate the following morning, May 6. The next day 7,500 sailors and marines paraded through San Francisco, and on May 8, Secretary of the Navy Victor H. Metcalf reviewed the fleet. San Francisco's welcome was truly rapturous, rewarding officers and men with elaborate parties, tours, and balls.

Although Australia's small white population of 4.2 million held deep racial anxieties of a surging Japan, no British battleship had ever visited the Commonwealth. The powerful US Fleet's reception was therefore particularly rapturous. Australian Prime Minister, Alfred Deaken, had bypassed London and gone straight to Roosevelt to formally invite the US Fleet, presenting the grumbling British government with a fait accompli. (NHHC NH 81513-KN)

Rear Admiral Sperry took overall command on May 15. Three days later, the battleships departed San Francisco and on May 21 steamed into Washington state's Puget Sound, where ships and crews toured Seattle, Tacoma, and Bremerton. On May 27, the last of the fleet departed Puget Sound to return to San Francisco. A US Navy publication claimed the "visit up and down the West Coast … was like a constant party, with everyone, sailor and civilian alike, celebrating this great adventure." On June 25, the Navy officially announced the Atlantic Fleet would steam around the world.

The fleet detached *Maine* and *Alabama* at San Francisco because of mechanical issues, but



Battleship USS *Rhode Island* (BB-17) in Sydney's Port Jackson during the Great White Fleet's visit, late summer 1908. Fort Denison's Martello tower hovers just above *Rhode Island's* stern. A general belief that London had neglected Australia inspired the warm reception; the Americans were so taken with the country that, once ashore, some 200 bluejackets deserted. (US Navy)

added the West Coast-based battleships *Wisconsin* and *Nebraska*. *Maine* and *Alabama* later completed the circumnavigation alone, ironically beating the fleet home. While on the West Coast, Evans was retired. Then on July 3, Rear Admiral Charles Thomas died of a heart attack. Four days later, the battleships departed San Francisco; *Nebraska*, delayed in port for two days with a scarlet fever outbreak, rendezvoused with the fleet at sea on July 15. The following day, the battleships arrived in Honolulu for a week of luaus, hula girls, and outrigger sailing, before departing with hundreds of pineapples on July 22.

The battleships conducted a steam-by of American Samoa on August 2, before anchoring at Auckland, New Zealand between August 9 and 14. After enduring a two-day storm in the Tasman Sea, the Americans were greeted by 250,000 spectators as they steamed into Sydney on August 27. After the triumphant Sydney visit, the fleet visited Melbourne between August 29 and September 6, then visited Albany, Western Australia from September 15 to 18. Intentionally delayed in Melbourne, on September 25, *Kansas* reunited with her sisters at Albany, carrying 458 bags of mail and some 100 deserters/stragglers. The fleet steamed into Manila Bay on October 2, but a Manila-wide cholera quarantine kept the battleships and crew offshore. On October 10, the battleships headed for Japan, but two days later ran into a fierce typhoon off Formosa.

Japanese-American relations were frosty, the result of Japanese public anger at the Roosevelt-brokered Treaty of Portsmouth and the San Francisco school district's recently legalized racial discrimination. Early 1907 had additionally seen anti-Oriental riots and media-fueled war scares in the United States. But the October 18 reception in Yokohama was unexpectedly warm, even triumphant; US officers were given free railroad passes, and a 50,000-strong torchlight procession paraded through Tokyo in the Americans' honor. The October 24, 1908 *Japan Daily Mail* reported, "The Fleets of East and West – of the two greatest naval Powers on the Pacific – met yesterday in peace and amity." Roosevelt reported, "Every particle of trouble with the Japanese government and Japanese press stopped like magic." Despite American fears, Japan never had any war plans and treated the cruise like the diplomatically friendly exercise it was.

During the Yokohama visit, *Kansas*'s Ensign William Halsey found himself a member of a select American party invited aboard IJN (Imperial Japanese Navy) flagship *Mikasa*. After *banzai*-crying IJN officers cheerfully tossed Sperry in the air three times, the Americans felt compelled to reciprocate with Admiral Togo. "We gave him three real heaves," Halsey recalled. "If we had known what the future held, we wouldn't have caught him after the third one."

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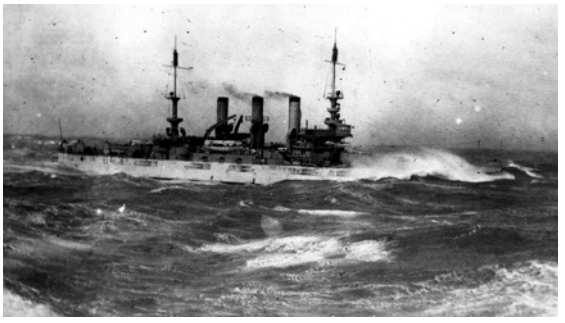
THE GREAT WHITE FLEET TRANSITS THE STRAIT OF MAGELLAN, FEBRUARY 8, 1908

En route from the Atlantic to the Pacific, Rear Admiral Robley Evans' flagship, battleship USS *Connecticut* (BB-18), leads the Great White Fleet through the Strait of Magellan on February 8, 1908. Trailing behind *Connecticut* are the Connecticut-class and Virginia-class battleships of the First Battleship Squadron. Out of view astern are the Second Battleship Squadron, auxiliaries, and destroyers. A midshipman described the Strait as "one of the grandest sights I ever saw. On each side of the ship towering over it were high steep rugged mountains, their tops covered with snow." However, the stark, desolate Patagonian landscape caused one American officer to remark, "We seem to be at the end of the world."



USS *Vermont* (BB-20) underway in heavy seas while cruising with the Great White Fleet. During a storm off Formosa, one sailor recalled, "All you could see, when a ship was in trough, was the trunk of its mast above the wave tops. That was all you could see of an entire battleship. Then our turn would come to go into a trough, and we couldn't see anything for a while." (NHHC NH 101072)

After departing Japan on October 25, the Second Squadron visited Amoy, China while the First Squadron returned to the Philippines. Addressing the loss of face vis-à-vis the hated Japanese receiving the full fleet, Chinese authorities claimed the eight missing US battleships had sunk in a typhoon. Ironically, USN officials had chosen the backwater Amoy for its supposed defensibility in case the IJN staged a Port Arthur-style ambush.

In Amoy the Chinese erected a $400,000 "Pleasure City" that included nine banquet halls and also hosted baseball games, gymnastics exhibitions, plays, and nightly fireworks for the enlisted men. The reunited fleet spent November 1908 performing gunnery practice in the Philippines. About 1,000 sailors transferred between the Atlantic Fleet and the Asiatic Fleet, while auxiliaries *Glacier* and *Relief* were detached in the Philippines.

The battleships then visited Colombo, Ceylon and officers and crew were presented with tea bags from Sir Thomas Lipton. The Americans celebrated Christmas 1908 underway in the Indian Ocean by decorating ships with palms, colored streamers, and coconuts. The fleet passed through the Suez Canal on January 4–7, 1909. At Port Said, Egypt came word of an earthquake in Messina, Sicily; *Connecticut*, *Illinois*, and supply ship *Culgoa* were dispatched to Messina to assist, arriving on January 9. From Port Said the rest of the fleet broke up to simultaneously visit Algiers, Tripoli, Athens, Malta, and Marseille.

By February 1, the battleships had regrouped at Gibraltar. The fleet departed for the US East Coast on February 6, 1909. On February 17, Rear Admiral Conway Arnold's Hampton Roads-based battleships *Maine*, *Mississippi*, *Idaho*, *New Hampshire*, and five cruisers (all painted war gray, not white) rendezvoused with the returning battleships 600 miles east-northeast of Bermuda for the final leg. Now totaling 20 battleships and five cruisers, the Atlantic Fleet steamed triumphantly into Hampton Roads on February 22, 1909 – George Washington's birthday. Each warship rendered a 21-gun salute upon passing Roosevelt's *Mayflower*. The epic 14-month, six-day voyage had steamed 46,729 miles and visited 20 ports on every inhabited continent. Some 430,000 tons of coal had been consumed. Roosevelt addressed *Connecticut*'s crew: "Others may do as you have done, but they will have to follow you."

Roosevelt had chosen not to run for re-election in 1908. Weeks after the Atlantic Fleet's return, on March 4, 1909, Roosevelt was replaced as President by his former Secretary of War, Republican William Howard Taft. Waiting on Taft's new White House desk was the traditional parting letter from the outgoing president. Roosevelt's only explicit advice was to implore Taft to never divide the fleet.

President Teddy Roosevelt stands atop *Connecticut's* after 12in turret while addressing her crew in Hampton Roads, Virginia. It is February 22, 1909 and the Great White Fleet has just returned to the United States. The successful circumnavigation of the globe was a resounding political, military, and technological success for Roosevelt and his now world-famous battle fleet. (NHHC NH 1836)

LATE CAREERS 1909–41

Post-cruise modernizations

As intended, the global cruise exposed deficiencies. Roosevelt had been adamant: "I want all failures, blunders, and shortcomings to be made apparent in time of peace and

not in time of war." The fleet had been supplied by 48 contracted colliers, of which 40 were foreign, mostly British. Therefore, in 1908 Congress ordered five USN colliers in addition to two already under construction. Most US pre-dreadnoughts went into overhaul for maintenance and modernizations between 1909 and 1911. The white-and-ocher Victorian livery was permanently discarded for a war-ready gray (the Royal Navy had converted to gray in 1902). As the low-riding US battleships were too wet, hull sponsons, bow shields, and unnecessary ornamentation were removed. Large, elaborate bridgeworks and superstructure top-hamper were extensively cut down and replaced with a simple fore bridge. Rapid-firing 3in/50 anti-torpedo boat guns replaced obsolete machine guns, 1-pdrs, and 6-pdrs, while the Maines and Virginias were additionally re-gunned with rebuilt 12in/40 guns. The new long-ranged, centralized fire control required high spotting platforms, resulting in the iconic American "cage" masts being installed aboard all US battleships.

Modernized with new equipment such as cage masts, *New Jersey* is seen testing experimental "dazzle" camouflage against US Navy rangefinders in 1918. The camouflage itself was called a McKay "disruptive low-visibility pattern." *New Jersey* spent all of World War I on the East Coast as a training ship, then transported returning US soldiers home from Europe through June 1919. (US Navy)

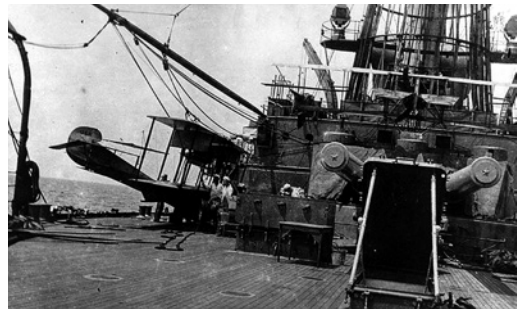
Nevertheless, in 1909, Imperial Germany's Kaiserliche Marine surpassed the United States as the world's second-largest navy. Tentative plans to divide the Atlantic-based US battle fleet between Atlantic and Pacific coasts were duly canceled. By 1912, all but the most modern US pre-dreadnoughts were allocated to state naval militias or the reserve. Most of the older pre-dreadnoughts' remaining secondary and tertiary guns would be removed in World War I to arm US merchantmen.

Veracruz 1914

An infinitesimal diplomatic incident at Tampico, Mexico, provided President Woodrow Wilson his pretext to intervene in the 1910–20 Mexican Revolution. On April 21, 1914, bluejackets and marines of dreadnoughts *Florida* and *Utah* and transport *Prairie* landed at Veracruz, Mexico, securing the waterfront against Mexican resistance. They were heavily reinforced the following day by Atlantic Fleet dreadnoughts and pre-dreadnoughts. By April 25, Lieutenant Commander Henry Mustin's *Mississippi* had arrived from Pensacola with 532 marines and a two-plane "aeroplane section" aboard. *Mississippi* launched the first front-line naval aviation mission in history that morning when Lieutenant Junior Grade Patrick Bellinger piloted the Curtiss Model F flying boat *AB-3* on a reconnaissance mission 3,000ft over Veracruz.

USS *Mississippi* (BB-23) en route to Veracruz, Mexico, April 21–24, 1914. The view is from *Mississippi's* fantail. On deck to port is Curtiss flying boat AB-3. Secured above the after 12in/45 turret is Curtiss hydroaeroplane AH-3. A boat boom on Mississippi's superstructure loads and unloads her embarked aircraft. (US Navy)

On May 2, Bellinger and observer Ensign W.D. LaMont flew *Mississippi*'s Curtiss hydroaeroplane *AH-3* over Tejar, Mexico, in scouting support of US marines who reported being under attack. On May 6, Bellinger's *AH-3* returned to *Mississippi* after flying reconnaissance over hostile Mexican lines. After landing, a single rifle bullet hole was found – the first US aircraft ever damaged by enemy fire. A following mission was also fired upon. "I wanted to return the favor," Bellinger later claimed, "but we were under orders not to use our revolvers offensively." Bellinger's observer would hurl a donated bar of soap at the Mexicans on a later mission.



Mississippi departed Veracruz for Pensacola on May 25. Atlantic Fleet commander Rear Admiral

Connecticut-class battleships maneuver off the US East Coast, 1917. From front to back, battleships *Louisiana* (BB-19), *Kansas* (BB-21), and *New Hampshire* (BB-25) are seen in echelon from the mast of division flagship *Minnesota* (BB-22). The Connecticuts were just modern enough to remain useful in World War I. (US Navy)

Charles J. Badger reported, "The Navy Aviation Corps on board … have performed their duties well and their observations while in flight have been of service to the land forces."

World War I 1917–1918

By April 1917, the USN's renamed Battle Force comprised 14 dreadnoughts and pre-dreadnoughts *Connecticut* and *Vermont* (which would be replaced in December 1917 and May 1918 by superdreadnoughts BB-41 *Mississippi* and BB-40 *New Mexico*). Remaining US pre-dreadnoughts were designated Force One, and commanded by Vice Admiral A.W. Grant (the front-line dreadnoughts were Force Two). They largely operated on the East Coast in training, escort, and patrol duties. Force One was divided into Squadron One, which trained engineers, and Squadron Two, which trained the deck force and armed guard for merchant ships. Officers tasked with training were often reservists or Naval Volunteers (naval militia) and were themselves completely inexperienced; in summer 1917 some 87 percent of *Virginia*'s crew had never been to sea before. The pre-dreadnoughts were packed with trainees; *Georgia*, designed for 750 men, hosted 1,045. Living conditions were atrocious, especially in rough seas requiring closed hatches. Force One's Squadron Two began training midshipmen in mid-1918.

Off the coast of Delaware on September 29, 1918, battleship *Minnesota* struck a German naval mine laid by *U-117*. *Minnesota* suffered severe damage to her starboard bow but no casualties. The crew's recent but intense ad hoc reinforcement/repairs of *Minnesota*'s dilapidated bulkheads may have saved *Minnesota* from sinking. She limped to the Philadelphia Naval Yard for five months of repairs. Along with superdreadnought *New York*'s accidental ramming of *UB-113*, the *Minnesota* incident was the only combat damage suffered by US battleships in World War I.

Concerned that German battlecruisers might break into the Atlantic, the USN began escorting convoys with battleships. *Kansas*, *New Hampshire*, and dreadnought *South Carolina* were first, escorting a convoy from New York to Britain between September 6 and September 24, 1918. *Nebraska* escorted convoy HX 49 between September 17 and October 3, followed

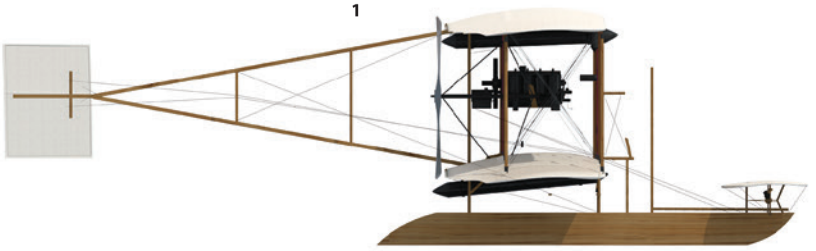
G

VERACRUZ 1914

1. Curtiss *AH-3* hydroaeroplane – The USN bought its first Curtiss Model E in May 1911 for $4,400, nicknaming the type "Triad" for its air/land/sea operations. The USN's first four were originally designated *A-1* through *A-4* until receiving the *AH* series designation. *AH-3* is seen in its April 1914 configuration at Veracruz. *AH-3* had an empty weight of 975lb. A 75-horsepower Curtiss O engine powered *AH-3* to a top speed of 65mph. Crew was one pilot and one passenger.

2. Curtiss *AB-3* flying boat – First produced in 1912, Curtiss named the type the Model F in 1913. The USN originally purchased five, designating them *C-1* through *C-5*, before re-designating them *AB-1* through *AB-5*. *AB-3* is seen here in its April 1914 appearance at Veracruz. *AB-3* had an empty weight of 1,860lb and was powered by a 100-horsepower Curtiss OXX-3 V-8. Top speed was 69mph, with a ceiling of 4,500ft.

3. Battleship *Mississippi* (BB-23) was reactivated in December 1913 to help re-establish the Pensacola Naval Station as the USN's first permanent aviation base. Under Lieutenant Commander Henry C. Mustin, *Mississippi* arrived at Pensacola in January 1914 with Lieutenant John H. Towers' aviation unit of seven planes and 32 men. On April 21, *Mississippi* sortied to Mexico in response to the Tampico incident. *Mississippi* is seen off Veracruz on April 25, 1914, when she became the world's first warship to deploy aircraft in action. *Mississippi*'s stern is fitted with an aircraft crane and her embarked Curtiss *AH-3* hydroaeroplane is stowed atop her after 12in turret.



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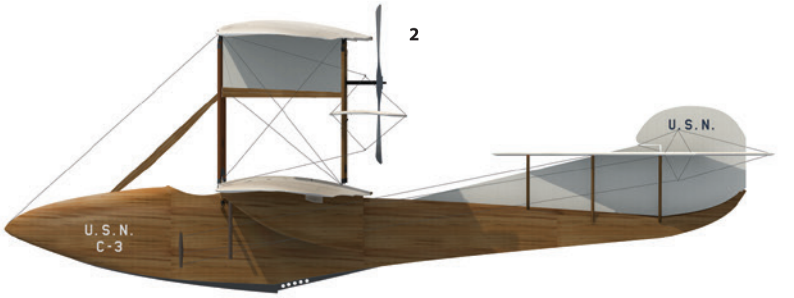

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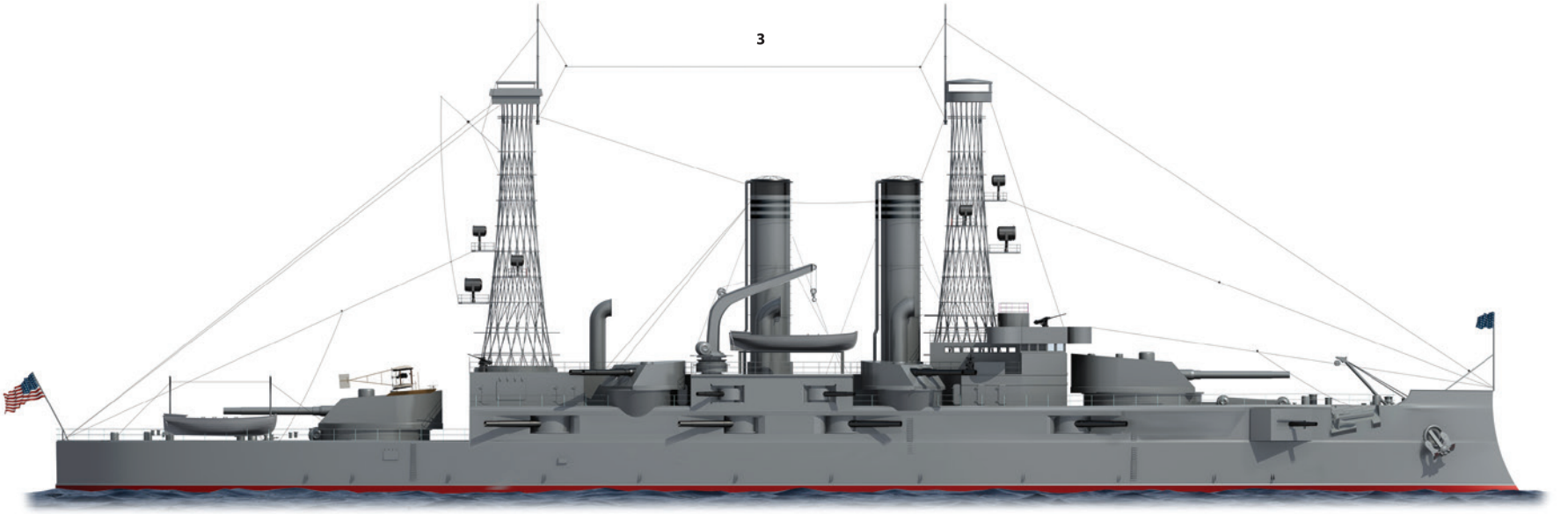

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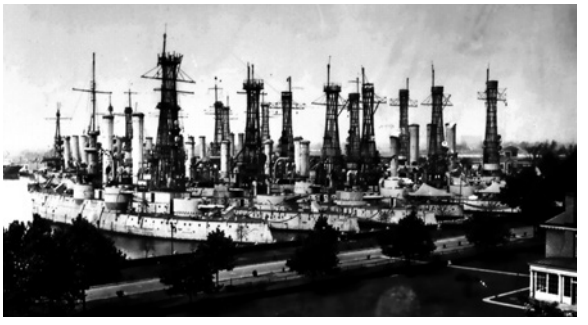

Old pre-dreadnought battleships laid up at the Philadelphia Navy Yard's Reserve Basin, October 22, 1919. From left to right are Spanish-American War veterans *Iowa* (BB-4), *Massachusetts* (BB-2), and *Indiana* (BB-1), followed by Great White Fleet members *Kearsarge* (BB-5), *Kentucky* (BB-6), and *Maine* (BB-10). *Indiana* and *Massachusetts* have 13 months to live, but *Kearsarge* would shortly find new life as a crane ship. (NHHC NH 92300)

by *Georgia*'s escort of US troop convoy Group 67 on September 23. Overloaded with coal, *Georgia*'s trip was wet and 134 cases of influenza and pneumonia resulted in seven deaths aboard.

After the November 11, 1918 armistice, newer US pre-dreadnoughts were assigned to the Cruiser and Transport Force and helped ferry US troops home. The first, *Georgia* and *Kansas*, departed Brest on December 26, 1918 with 2,732 American Expeditionary Forces passengers aboard. These operations concluded successfully in July 1919. Most remaining US pre-dreadnoughts were decommissioned by 1920 and either scrapped or expended as targets by 1924.

Kilkis and *Lemnos* 1914–41

Battleships *Kilkis* (ex-*Mississippi*) and *Lemnos* (ex-*Idaho*) were commissioned into the *Vasilikón Naftikón* (Royal Hellenic Navy) at Newport News, Virginia, on July 22, 1914. *Kilkis* became the Hellenic flagship. Henry Morgenthau, US ambassador to Turkey, reported *Kilkis* and *Lemnos* "immediately took their places as the most powerful vessels of the Greek Navy, and the enthusiasm of the Greeks in obtaining them was unbounded." Along with the *Goeben* and *Breslau* incident, Morgenthau claimed the Mississippis "were a major factor in Turkey's decision in October 1914 to enter [World War I] as Germany's partner."

After the Allies landed troops in Salonika, the French seized control of the *Vasilikón Naftikón* on October 19, 1916, and both battleships were virtually demilitarized. *Kilkis* and *Lemnos* then participated in the Allied Crimean Expedition to assist the White Russians in 1919, with *Lemnos* providing naval gunfire support to the Volunteer Army at Kaffa. The battleships then served in the 1919–22 Greco-Turkish War, where they operated but saw scant combat. *Lemnos*'s captain, Dimitrios Fokas, would help lead the September 11, 1922 Revolution, which deposed Greece's King Constantine in favor of Constantine's son George II. By 1930, the battleships were well past their prime, and armored cruiser *Georgios Averof* replaced *Kilkis* as fleet flagship.

Mussolini's Fascist Italy invaded Greece on October 28, 1940. After the British raid on Taranto, guns from *Kilkis* and *Lemnos* were used to arm Greek coastal batteries. In support of its Italian ally, Nazi Germany invaded Greece on April 6, 1941. Ju 87 Stuka dive-bombers would sink both *Kilkis* and *Lemnos* at Salamis on April 23, 1941.

CONCLUSION

As late as 1895, the United States had never commissioned a battleship. Thereafter, a wide range of technical and operational experience was gained in a short time. American traditions of committee input and checks-and-balances stoked much short-term friction, but eventually the process couldn't help but right itself. However flawed the earliest classes were, there were no disastrous pet projects of unchecked single minds, as occurred in other navies. American culture values scientific rationality and zealous, even antagonistic debate. Many of the USN's technical and operational improvements were accordingly pushed through

by inspired and outspoken junior officers irreverent to tradition and decorum. If contemporary reviews of early US battleships often appear damningly critical when compared to those of their foreign counterparts, one must partly blame the uniquely public nature of American society, which was the most unflinchingly open and aggressively self-correcting in the world.

In a free republic, the power to authorize and fund warships rightly lay with the people's elected representatives, but even Congress slowly began learning to retreat from politically motivated micromanagement and leave the technical details to the professionals. It had taken 20 years, but by the end of the pre-dreadnought era, American battleships finally equaled the best foreign concepts, and the steady progress continued through the end of the all-big gun era, the true legacy of US pre-dreadnoughts. If a single navy between 1910 and 1945 produced consistently better battleships than the rest of the world, it was the United States.

Greek battleship *Kilkis* (ex-*Mississippi*) burning at Salamis, 1941. *Kilkis* and her sister *Lemnos* had long been removed from front-line service when the Wehrmacht invaded. On April 23, 1941, Luftwaffe Stukas shrieked over Salamis and dive-bombed the battleships. Unable to get underway, *Kilkis* was hit by several bombs and sunk. (NHHC NH 54431)

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INDEX

Page numbers in **bold** refer to illustrations and their captions.

aircraft 43–44, **43**, **G(44–45)**
Alabama, USS 6, 19, 21, 36, 39, 40
Arkansas, USS 36
armor 10, 18, 19–20, **20**
  Connecticut class 28, **31**
  Maine class 21, **21**
  Mississippi class **30**, **31**
  Virginia-class 24, **24**
Asiatic Fleet 7, **34**, **E(34–35)**
Atlantic, the 5
Atlantic Fleet 37, **37**
Australia **39**, 40, **40**

battle fleets 5
Board on Construction 8, 24, 25, 29, 30
boilers 11, 20, 21, 24–25, 29–30
Bowles, Rear Admiral Francis T. 10

Caribbean, the 5
Carnegie and Bethlehem 10
Central American canal 5–6
China 5, 32–33, 34, 42
Clayton-Bulwer Treaty 5
coal stocks 33
coastal defense 7
Connecticut, USS **12**, 28, **28**, 29, **34**, 39, **F(40–41)**, 42, **42**, 44
Connecticut class **6**, **B(16–17)**, 25, **D(26–27)**, 28–29, **28**, **31**, **44**
continuous aim firing 14
Cuba blockade 7

Dewey, George 6, 28, 32
Dewey, USS 33
Dreadnought, HMS 15, 16, 28, **28**
dreadnoughts 15–16

engines 11
enlisted personnel 31–32
European Squadron 36, **36**
Evans, Rear Admiral Robley 21, 37, 38, 39, 40

Fisher, Admiral Sir Jackie 13
Fiske, Bradley 4
floating drydock **C(22–23)**, 33
Florida, USS 36
foreign stations 7

General Board 6
General Naval Scheme 6–7
Georgia, USS **11**, 12, **13**, 24, 25, **37**, 44, 46
Germany 6–7
Goodrich, Captain Caspar F. 5
Great Britain 5–6
Great White Fleet cruise 4, **6**, **A(8–9)**, 31, 37–40, **37**, **38**, **39**, **40**, **F(40–41)**, 42, **42**
Greco-Turkish War 46
Greece 46, **47**
guns **13**, **14**, 15
  accuracy 13–14
  anti-aircraft 12
  anti-torpedo 12
  Connecticut class 25, 28
  Illinois class 19
  Kearsarge class 16, **18**
  Maine class 21
  manufacture 11–12
  Mississippi class 29
  rapid-firing 12–13, 25, 43
  rate of fire **12**, 13
  Virginia class 22, 24

Halsey, Ensign William 40
Hay-Bunau-Varilla Treaty 6
Hay-Pauncefote Treaty 6
Hichborn, Admiral Philip 24

Idaho, USS 30, 31, 42, 46
Illinois, USS 6, 19, 20, 21, **C(22–23)**, 36, 42
Illinois class 11, 19–21, **20**, **E(34–35)**
Imperial Russian Navy 10
Indiana, USS 6, 8, 19, 36, **46**
Indiana-class 7–8, 16
Iowa, USS 6, 8, 12, 16, 18, 34, 36
isolationism 5, 6, 8

Japan 40, 42

Kaiserliche Marine 43
Kansas, USS **12**, **D(26–27)**, 28, 29, **37**, 40, 44, **44**, 46
Kearsarge, USS 6, **10**, 11, 12, 16, **18**, 20, 36, **46**
Kearsarge class 8, 11, 16, 18–19, **18**, **E(34–35)**, **36**
Kentucky, USS **7**, 8, 10, 13–14, 16, 18, 19, 20, 34, **E(34–35)**, **46**
Kilkis (ex-*Mississippi*) 46, **47**
Krupp 10

Lemnos (ex-*Idaho*) 46
Louisiana, USS 28, 29, **44**

Mahan, Captain Alfred Thayer 5, 28, 32
Maine, USS 7, 8, 11, 12, 21, 22, 24, 29, **32**, 39, 40, 42, **46**
Maine class **A(8–9)**, 11, 13, **14**, 21–22, **21**, 43
maintenance 32
Massachusetts, USS 6, 8, 19, 36, **46**
Mexican Revolution 43–44, **43**, **G(44–45)**
Michigan, USS 4, **7**, 16
Minnesota, USS 28, 29, 44, **44**
Mississippi, USS 30, **30**, 31, 42, 43–44, **43**, 44, **G(44–45)**, 46, **47**
Mississippi class 29–31, **30**, **31**
Missouri, USS **A(8–9)**, 11, 12, 21, 22
Monadnock, USS 34
Monroe Doctrine 6
Monterey, USS 34
Morgenthau, Henry 46

naval bases 32–33, **32**, **33**
naval doctrine 4–5
Navy Department 8
Nebraska, USS **B(16–17)**, 24, 24–25, 25, 40, 44
Nevada, USS 36
New Hampshire, USS **B(16–17)**, 28, 29, 42, 44, **44**
New Jersey, USS 24, 25, **37**, **39**, **43**
New Mexico, USS 44
New Navy, the 4
New Orleans, USS 34
New York, USS 34, 44
Newark, USS 36
North Atlantic Fleet 7, 32, 36–37
North Atlantic Squadron 7

officers 31
Ohio, USS **14**, 21, 22, **33**, 34
Oklahoma, USS 11
Oregon, USS 8, 34, 36
organization 7

Pacific, the 5, 6–7
Pacific Fleet 34, 36
Panama Canal **7**, 33
Panama Canal Zone 32
Pennsylvania, USS 24
personnel 31–32, **32**
Philadelphia, USS 34
Philippines, the 5
post-cruise modernizations 42–43, **43**
pre-dreadnoughts 16, **B(16–17)**, **46**
  weapons 11–15, **12**, **13**, **14**
promotion system 32
Puck **5**

Reuterdahl, Henry 10
Rhode Island, USS **A(8–9)**, 25, **37**, **40**
Rio de Janeiro **38**, 39
Roosevelt, Theodore 5–6, 6, **6**, 7, 14, 31, 32, 37, 38, 40, 42, 42–43, **42**
Royal Hellenic Navy 46, **47**
Royal Navy **32**, 43
Russo-Japanese War 11

San Francisco 39, **39**, 40
Santiago, battle of 13, 24
Scott, Captain Sir Percy 13–14
Second-Class Battleships 7
Sims, Vice Admiral William S. 8, **8**, 10, 13–14
single key firing 14
sluices 11
smokeless powder 12, 21
South Atlantic Squadron 36
South Carolina, USS 44
Spanish-American War 4, 5, 8, 13, 32
Squadron of Evolution **A(8–9)**
Strait of Magellan **F(40–41)**
strategy 4–5, 6–7
Strauss, Ensign Joseph 16, 18
Subic Bay 33
Suez Canal 42

tactical doctrine 5
Texas, USS 7, 8, 28, 36
Thomas, Rear Admiral Charles 39
torpedoes 13, 14–15, 15, 16, 21, 28
turrets **13**, **14**, 16, 18, 24

US Army 7
USN (United States Navy) 4, 5, 46–47
  strength 6–7

Venezuela crisis 6, 7
Veracruz 43–44, **43**, **G(44–45)**
Vermont, USS 28, 29, **37**, **42**, 44
Virginia, USS 24, **24**, 25, 44
Virginia class **A(8–9)**, **11**, 13, **13**, **B(16–17)**, 22, 24–25, **24**, 43

warship design 8, 10–11, 46–47
watertight doors 11
weapons
  dreadnoughts 16
  post-cruise modernizations 43
  pre-dreadnoughts 11–15, **12**, **13**, **14**
Wisconsin, USS 19, 21, 34, **E(34–35)**, 36, 40
World War I **B(16–17)**, 44, **44**, 46
Wyoming, USS 34

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